AMERICAN JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

HENRY KRAEMER, Ph.D., Editor.

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VOL. 73. MAY, 1901. No. 5

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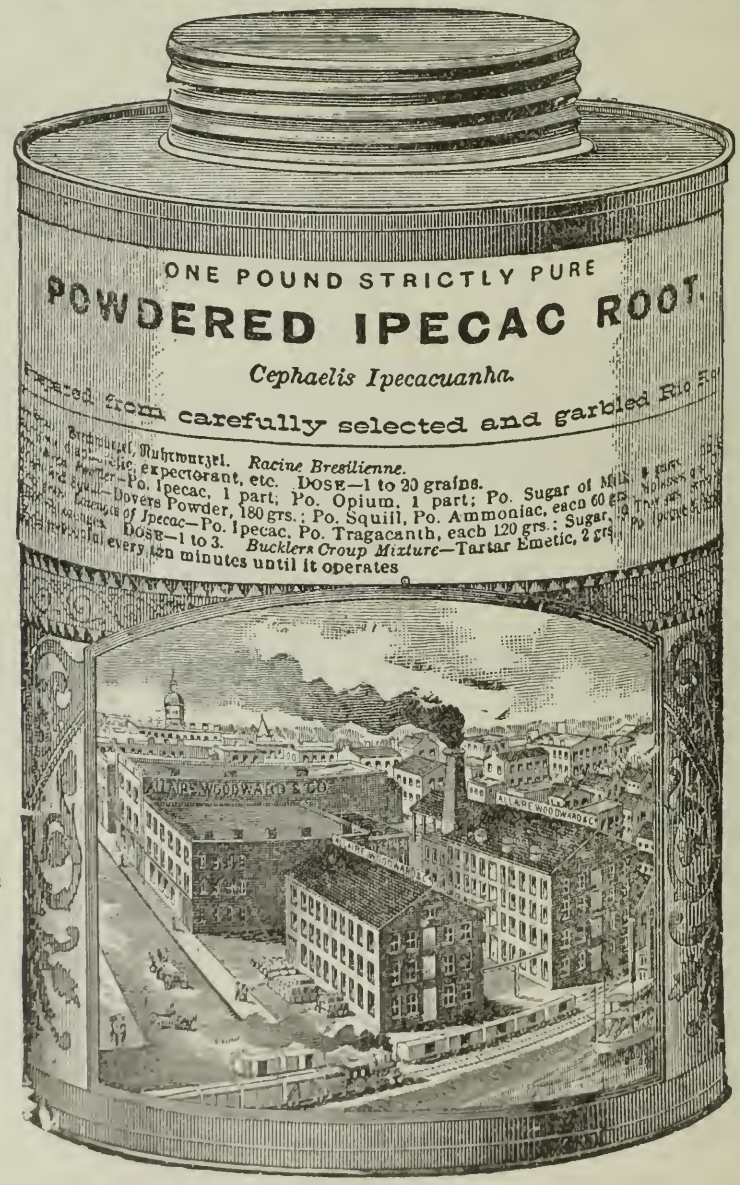
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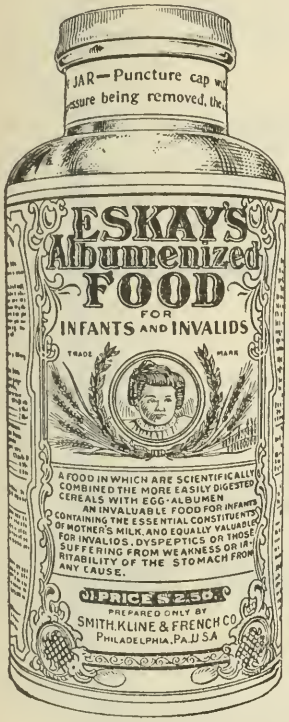
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MAY, 1901.

CONTRIBUTIONS FROM H. M. GORDIN.

(*Concluded from p. 168.*)

NUX VOMICA.—STANDARD METHOD.

This drug is very difficult to exhaust completely. After trying several neutral, as well as acid menstrua, the following method was found to work well. Though in this method acid is used, the method can nevertheless be used as a standard, it being well known that the strychnos alkaloids are not easily affected by dilute acids.

Ten grammes of drug in No. 60 powder were moistened in a screw top jar with 5 c.c. of a menstruum containing 75 per cent. alcohol and 2 per cent. phosphoric acid. The jar was then covered and set aside for forty-eight hours. The drug was then put in a small percolator, the jar washed out several times with the same menstruum, the washings poured on top of the drug and more of the same menstruum added till the liquid reached the lower orifice (about 23 c.c. menstruum was used). The percolator was then closed and set aside for twelve hours. The percolation was then continued very slowly with a menstruum containing 75 per cent. alcohol and about one-quarter of 1 per cent. phosphoric acid till about 200 c.c. were obtained. The first 10 c.c. were received into a 100 c.c. measuring flask and the rest concentrated in vacuo, first at about 45° C., and then at ordinary temperature till the percolate was reduced to about 60 c.c. The concentrated extract was then added to the reserved portion, the vessel in which the concentration took place washed with water and the whole made up to 100 c.c. This was shaken about one-half hour with talcum powder,

filtered, and from 20 c.c. of the filtrate (= 2 grammes of drug), after making alkaline with ammonia, the alkakoids were shaken out three times with a mixture of three parts of ether and one part chloroform, using 30 c.c. of this mixture each time. After distilling off the ether-chloroform, the alkaloids were taken up with a little chloroform, then 20 c.c. $\frac{N}{40}$ acid added, and the last trace of chloroform removed by a current of air. The final estimation was then made alkalimetrically, using $\frac{N}{40}$ alkali for residual titration and Mayer's reagent as precipitant. The dregs in the percolator were tested for alkaloid as described above. None were found either by reagents or by taste.

The amount of $\frac{N}{40}$ acid consumed by 2 grammes of the drug assayed by this standard method was found to be 7·2 c.c. = 3·27 total alkaloids (taking the mean factor of strychnine and brucine).

Having assayed the drug by this method, method A was applied, continuing the boiling for six hours, but the results were far below those obtained by the standard method, but method B, after reducing the drug to a very fine powder (about No. 100), gave results approaching very near those obtained by the standard method.

Two assays were then made by method B, digesting 4 grammes of the finely powdered drug with 50 c.c. of modified Prollius' fluid, shaking (in shaker) four hours, drawing off 25 c.c. (= 2 grammes drug), and shaking out with acid water. The acid solution was made alkaline with ammonia, and the alkaloids shaken out three times with a mixture of two parts chloroform and one part ether, using 30 c.c. of this mixture each time. The ether-chloroform was distilled off completely, the residue taken up with 20 c.c. $\frac{N}{40}$ H_2SO_4 and a little chloroform, and the chloroform removed by blowing air into the flask. The estimation was finished in the regular way.

Method Used.	$\frac{N}{40}$ Acid Consumed by 2 Grammes.	Percentage of Total Alkaloids.
Standard	7·2 c.c.	3·27
B	6·9 c.c.	3·14
B (duplicate)	6·8 c.c.	3·09

The results obtained by method B are a little lower than those obtained by the standard method, but they are the best I was able

to obtain from several other methods. Possibly by further trials another method might be found, the results of which will approach those obtained by the standard method better than those obtained by method B.

CINCHONA BARK.

After several trials the method given below was found to give good results. As in the case of nux vomica, an acid menstruum had to be resorted to, no neutral menstruum with or without glycerine giving complete exhaustion. As acetic acid did not improve much the exhaustion, diluted hydrochloric acid was taken. The assay was made with a view of estimating the total alkaloids as well as the ether soluble alkaloids. As alkalimetric factor of ether soluble alkaloids, the mean diacid factor of quinine and cinchonidine was taken, which for $\frac{N}{40}$ acid is 0·00385.[1]

THE STANDARD METHOD.

Ten grammes of cinchona bark in No. 60 powder were moistened with 5 c.c. of a mixture containing 50 per cent. alcohol and 2 per cent. hydrochloric acid, and the extraction finished in the same way as that of nux vomica, using hydrochloric acid instead of phosphoric. After concentration in vacuo, the liquid was made up to 100 c.c., filtered, and 25 c.c. of the filtrate (2·5 grammes drug), after making strongly alkaline with sodium hydrate, were shaken out three times with a mixture of three parts ether and one part chloroform, using 30 c.c. each time. The ether-chloroform was shaken up with a little calcined magnesia, filtered into a tared flask, the vessel and filter well washed with ether-chloroform, and the liquid completely removed by distillation. After drying the flask at 130° C. for one hour, it was cooled in desiccator and weighed. This gave the total alkaloids in 2·5 grammes of drug.

To the flask containing the total alkaloids, 10 c.c. absolute ether and a few grammes coarse clean quartz was added and the flask shaken in a horizontal plane till all the adhering matter was rubbed off by the quartz from the walls; the liquid was then filtered through a small dry filter into another flask, the first flask, the quartz and the filter washed three times with absolute ether, using 5 c.c. each

[1] As will be shown in a subsequent paper.

time, and the ether completely distilled off. The residue of the ether soluble alkaloids was now taken up with a little chloroform and 40 c.c. $\frac{N}{40}$ sulphuric acid, the chloroform removed by a current of air from foot bellows and the alkaloids estimated alkalimetrically, using $\frac{N}{40}$ alkali for residual titration, and a 2 per cent. solution of iodine in potassium iodide as precipitant. The completeness of exhaustion was proved by testing the dregs in the percolator, as described above.

Using this method as a standard, several other more expedient methods were tried. None gave as good results when compared with the standard as method B. Two assays were then made by method B, using 10 grammes[1] of the same bark reduced to a very fine powder for each assay, digesting with 100 c.c. modified Prollius' fluid, drawing off 25 c.c. (= 2·5 grammes of drug) and shaking out with acid water. The acid solution was then shaken out with light ether-chloroform and the assay finished exactly as in the standard method. The results were as follows:

Method Used.	Total Alkaloids from 2·5 Grammes.	$\frac{N}{40}$ Acid Consumed by 2·5 Grammes.	Percentage.	
			Total.	Ether Soluble.
Standard . . .	0·1702 gramme	23·2 c.c.	6·81	3·57
B	0·1682 gramme	23·4 c.c.	6·73	3·60
B (duplicate) .	0·1690 gramme	23·3 c.c.	6·76	3·58

As method B gives practically the same results as the standard method, this method B should be adopted for the assay of cinchona bark.

IPECAC.

This is another drug which is extremely difficult of exhaustion. The following method was found to give the best results:

Ten grammes of drug in No. 60 powder were shaken two days in a shaker with 100 c.c. of a menstruum containing 50 per cent. alcohol and 2 per cent. acetic acid, the whole was then thrown into a percolator, returning the first parts to the percolator till the percolate came out clear, and the percolation continued with 50 per cent. alcohol containing about one-quarter of 1 per cent. of acetic acid, till exactly 600 c.c. were obtained. 150 c.c. of the percolate (= 2·5

[1] If the drug is of a poor quality, 20 grammes should be taken for the assay and both the menstruum and the aliquot part doubled.

grammes) was made alkaline with ammonia and shaken out four times with a mixture of four parts ether and one chloroform, using 200 c.c. of this mixture each time. The ether-chloroform was distilled off completely, the residue taken up with about 10 c.c. of acidulated (1 per cent.) water, and the liquid filtered into a small separator, washing the vessel from which the ethereal liquid was distilled and the filter repeatedly with small quantities of acidulated water. The alkaloid was now shaken out with heavy ether-chloroform (1 ether, 2 chloroform) and ammonia, and the ether-chloroform completely distilled off. The residue was taken up with a little chloroform and 20 c.c. $\frac{N}{40}$ sulphuric acid, and after the removal of the chloroform by a current of air, the assay was finished alkalimetrically, using Mayer's reagent as precipitant. The dregs in the percolator were tested for alkaloid as usual, but none was found.

Using this as a standard, I assayed the drug by many different methods, but no method gave as good results as those obtained by the standard method. Those obtained by method B, after reducing the drug to a No. 100 powder, came nearest to those obtained by the standard.

Method Used.	$\frac{N}{40}$ Acid Consumed by 2·5 Grammes.	Percentage of Alkaloid.
Standard	11·5 c.c.	2·92
A	9·6 c.c.	2·43
B	10·2 c.c.	2·59

It will be noticed that 0.00635 was taken as the factor of emetine for each cubic centimetre of $\frac{N}{40}$ acid. This is based upon the assumption that the formula of emetine is $C_{30}H_{40}N_2O_5$ (Kunz Krause, *Arch. d. Pharm.*, 225, 461 : 232, 466) and that the salts of emetine correspond to the formula $C_{30}H_{40}N_2O_5\ 2\overline{A}$ where $\overline{A}$ is one molecule of a monobasic acid. As this formula is not yet accepted all around,[1] the above factor will possibly have to be slightly changed. But as in the present case determinations were only made with a view of comparing the results obtained by the standard method with those obtained by the simpler methods, it is immaterial what factor we use provided it be the same in all cases. The only fact that re-

[1] Lefort and Wurz, *An. Chim. Phys.* (5), 12, 247 ; Glénard, *ibid.*, 8, 233 ; Paul and Cownley, *Pharm. J.* (3), 24, 61.

quires to be proved is that emetine, like most other alkaloids, can be exactly estimated by my alkalimetric method.[1] Though this could be admitted *a priori*, for the reason that emetine is precipitated by Mayer's and Wagner's reagents from extremely dilute slightly acid solutions, it was thought best to bring experimental proof of the exactness of the alkalimetric estimation of this alkaloid. For the establishment of this fact also it is immaterial what the real formula of emetine is. All that we need to prove is that if we standardize our acid and alkali with definite amounts of this alkaloid, and in this way deduce a factor for our standard liquids, this factor will give exact results with other quantities of the same alkaloid.

A dilute (about $\frac{N}{40}$) solution of sulphuric acid was standardized against a dilute solution of KOH, using phenolphtalein as indicator, so that the acid and alkali corresponded exactly cubic centimetre per cubic centimetre. 0·0926 gramme of emetine (Merck's) was now dissolved in 50 c.c. of this dilute acid contained in a 100 c.c. measuring flask. An excess of Mayer's reagent was added, and the flask filled up to 100 c.c. After a few shakings the precipitate separated out completely and the supernatant liquid became perfectly transparent. The liquid was now filtered, and in 50 c.c. of the filtrate the excess of acid determined by means of the alkali. It was found that the 0·0926 gramme emetine consumed 14 c.c. of our acid. Hence 1 c.c. of our acid was equivalent to 0·0066 gramme of our emetine.

Two samples of the alkaloid were now weighed out and the amounts estimated exactly as above, using the factor 0·0066 for each cubic centimetre of acid.

	Emetine Taken.	Our Acid Taken.	Our Acid Consumed.	Emetine by Factor 0·0066.
(1)	0·1829	75 c.c.	27·6 c.c.	0·1822
(2)	0·1071	30 c.c.	16·4 c.c.	0·1082

We see that the alkalimetric method gives as good results with emetine as with quinine,[2] cinchonidine,[2] morphine, atropine, cocaine, strychnine, hydrastine, caffeine and acid salts of berberine.[3]

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[1] The application of the method to the cinchona alkaloids I shall show in my next paper.

[2] Will be shown later.

[3] This will be shown in another paper.

II. ASSAY OF CONIUM SEED OR LEAVES.

The assay of this drug presents considerable difficulty. Owing to the volatility of coniine even at ordinary temperature, its solutions in immiscible solvents cannot be evaporated without loss, and as the alkaloid is not completely precipitated by Mayer's or Wagner's reagents, it cannot be estimated by my general method. The method which I have found to give excellent results is a modification of the method of Cripps,[1] and its details are as follows:[2]

Put 20 grammes of finely powdered conium into a 300 c.c. glass-stoppered bottle, pour in 200 c.c. of a previously prepared mixture of one volume of chloroform and three volumes ether, shake about five minutes, add 10 c.c. liquor potassa, shake frequently during four hours, and set aside over night. Pipette off 100 c.c. of the clear liquid into a 300 c.c. flask, add 10 c.c. of a 2 per cent. solution of oxalic acid in alcohol and mix well. Distil off the liquid completely, removing the last traces by blowing air into the flask while keeping it on the water-bath. Let cool, add 10 c.c. absolute alcohol, warm gently and cool again. Filter the alcoholic solution into a wide beaker, washing the flask, and filter three times with 5 c.c. each time of absolute alcohol. Evaporate the alcohol almost completely from a warm water-bath, add 10 c.c. water and pour into a 25 c.c. measuring flask, cool, and fill up to the mark with water. Add about 2 grammes talcum, shake well and filter through a small dry filter. Pipette off 12·5 c.c. (= 5 grammes drug) into a 100 c.c. separator, add 25 c.c. petroleum ether (boiling below 60° C. and leaving no residue on evaporation) and 5 c.c. of a 10 per cent. solution of KOH. Shake well and set aside until the liquid separates into two layers. Draw off lower layer into a 50 c.c. separator, add to it 20 c.c. petroleum ether, and shake. After separation into two layers, draw off lower layer into a beaker and pour contents of second separator into the first one. Return the aqueous liquid to the smaller separator and shake it again with 20 c.c. petroleum ether. Draw off aqueous layer and pour the petroleum ether from the second into the first separator.

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[1] *Pharm. J. Trans.* (3), 18, 13, 511; Allen, "Commerc. Org. Anal.," Vol. III, part II, 1892, 176.

[2] Later on I intend to test the exactness of this method by comparing its results with those obtained by some standard method as given in the previous paper.

Test a few drops of the aqueous liquid, after acidulating, with Wagner's reagent. If no reaction, reject it. If a reaction is obtained, shake the liquid again with 20 c.c. petroleum ether in the second separator, reject aqueous liquid and transfer the petroleum ether from the second to the first separator. Now add about 0·5 gramme MgO to the petroleum ether and shake well about fifteen minutes. Filter into a 300 c.c. flask, washing separator and filter repeatedly with petroleum ether and keeping funnel covered with a watch-glass. Add 50 c.c. of a perfectly clear saturated solution of HCl gas in absolute ether,[1] mix well and distil off the solvent from a warm water-bath completely, removing last traces by means of a current of dry air. Now add to the flask 25 or 30 c.c. $\frac{N}{40}$ $AgNO_3$ and then 5 c.c. 10 per cent. HNO_3. Put on water-bath, and when the supernatant liquid becomes clear, cool the flask, transfer its contents into a 100 c.c. measuring flask, and make up the whole to 100 c.c. Filter, add to 50 c.c. of the filtrate 5 c.c. test solution of ferric alum and titrate the excess of silver nitrate with $\frac{N}{40}$ potassium sulphocyanate in the usual way.

The number of cubic centimetres of $\frac{N}{40}$ $AgNO_3$ consumed by the 5 grammes drug multiplied by 0·0635 gives the per cent. of coniine in the drug.

III. ASSAY OF FLUID EXTRACT CINCHONA.

In a previous paper[2] I have given a general method for the assay of fluid extracts. As given there, the assay of fluid cinchona gives only the total alkaloids, but as it seems desirable to have a method that would show both the total and the ether soluble alka-

[1] If water be present in the ether, the ethereal solution of HCl will be turbid, and when the ether is distilled off from the coniine hydrochloride, the acid becomes concentrated in the last aqueous portions and colors the alkaloid greenish-red. If ether containing some water be saturated with gaseous HCl, and the solution set aside for a few hours, all the water will settle down, taking along most of the HCl; if the ether be now poured off from the aqueous layer and again saturated with HCl, it will be perfectly clear and free from water. The HCl is best generated by dropping commercial hydrochloric acid from a dropping funnel into concentrated acid and washing the gas by passing it through a small quantity of sulphuric acid.

[2] *Arch. d. Pharm.*, 1900, 340; Proceed. A.Ph.A., 1900, 125.

loids, I propose the following method which has given me very good results:

Put 10 c.c. of the fluid extract into a 50 c.c. measuring flask and fill up to the mark with a 2 per cent. solution of sulphuric acid. Add about 1 or 2 grammes powdered talcum, shake vigorously a minute or two and filter through a dry filter. By means of a pipette or a burette transfer 25 c.c. (= 5 c.c. extract) into a separating funnel having a capacity of about 125 to 150 c.c. Add into the separator 40 c.c. of a mixture of three volumes of ether and one volume of choloroform, then add a considerable excess of a 10 per cent. solution of potassium hydrate, and shake well a few minutes. Set aside until the mixture has separated into two layers. There is generally no emulsion at all. Should there be one, the addition of a little more potassium hydrate will generally destroy it. Draw off the lower layer into a second smaller separating funnel, add to it about 20 c.c. of the same ether-chloroform mixture and shake again a few minutes. After separation into two layers, draw off the lower layer into a beaker and carefully pour the ethereal liquid from the smaller into the larger separator. Return the aqueous liquid to the smaller separator and shake out once more with about 20 c.c. of above ether-chloroform mixture. When the liquids have separated into two layers, draw off the lower layer, which can now be rejected, and carefully pour again the ethereal liquid from the second into the first, larger separator. Now add into the separator 1 gramme of calcined magnesia, and shake until the ethereal liquid, upon a few minutes' standing, separates out crystal clear. If it does not become perfectly clear, add a little more magnesia and shake. Now filter through a dry filter into a light tared flask, washing the separator and the filter repeatedly with ether, and distil off the ethereal solvent completely, taking care to prevent loss by spurting.[1] Dry the flask for two hours at 130° C., and after cooling in desiccator, weigh. The weight multiplied by twenty gives the per cent. of total alkaloids in the extract.

For the estimation of ether soluble alkaloids, add into the flask a few grammes of clean coarse quartz and then 10 c.c. of stronger ether, then give the flask a circular motion in a horizontal plane till all adhering matter is detached from the sides of the flask. Now

[1] This can be done by laying the flask on its side.

filter the ethereal solution into a small flask, washing the quartz and the filter three or four times with stronger ether, using 5 c.c. each time. Add to the ethereal solution 20 or 25 c.c. of $\frac{N}{10}$ H_2SO_4, mix carefully by gentle rotation, and distil off the ether completely, removing the last traces by a current of air. Cool and transfer the acid solution to a 200 c.c. measuring flask, washing the distilling flask repeatedly with water. Add to the measuring flask an excess of Wagner's reagent, make the liquid up to 200 c.c. and shake till supernatant liquid is perfectly clear but dark red. Filter off 100 c.c., decolorize with enough sodium thiosulphate solution and titrate excess of acid with $\frac{N}{100}$ potassium hydrate, using phenolphtalein as indicator. The number of cubic centimetres of $\frac{N}{10}$ acid consumed by the 5 c.c. of the extract multiplied by 0·308 [1] gives the percentage of ether soluble alkaloids in the extract.

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OXYGENATED PETROLATUM.

By M. I. Wilbert.

For several years a proprietary preparation has been on the market known by and sold under the trade-marked name "Vasogen." This article is claimed to be "a more or less oxygenated mineral oil that combines readily with active medicaments, for which it acts as an ideal vehicle, facilitating their absorption and intensifying their activity." The claims made by the manufacturers in favor of this preparation, its usefulness and advantages, are so numerous and sweeping that the American agents have been able to create quite a demand for several of the preparations of Vasogen, despite the almost prohibitory price asked for them in this country.

In Germany this and similar preparations of mineral oils seem to be better known and more extensively used. Quite a number of articles have appeared, from time to time, in the medical journals of Germany, reporting on the use and advantages of oxygenated vase-

[1] This factor is obtained by taking the mean diacid factor of quinine and cinchonidine; the exactness of the factor will be shown in my next paper.

line as a base and vehicle for active drugs. The writer's attention was especially attracted by an article, contributed to the *Pharmaceutische Centralhalle* (1900, p. 631), by G. Roch, in which the author describes "Vasogen" and its physical properties, and also gives a formula for making an article that is nearly identical in appearance and in many of its other qualities. The formula given by Roch is as follows: Liquid paraffine, 100; oleic acid, 50; aqua ammonia, Ph. Ger., 25; alcohol, 10. Mix in a flask or beaker and heat on a water-bath, stirring constantly, until the liquid is perfectly clear and transparent. The resulting product is practically a solution of an ammonia soap in liquid paraffine.

A preparation of this kind seemed to offer so many possibilities for practical application that the writer was induced to make some experiments with a view of still further simplifying the formula, so as to avoid, if possible, the rather tedious process of boiling. The following formula was finally adopted as giving a satisfactory product with little or no possibility of failure, even in the hands of the veriest tyro: Liquid paraffine, 100; oleic acid, 50; spirits of ammonia, U.S.P., 25. Mix. The resulting mixture is a yellow, oily liquid that readily dissolves iodine, salol, salicylic acid and many of the alkaloids, mixes readily with chloroform and the essential oils, and makes a stable emulsion with water in almost any proportion. The alcohol remaining in the preparation does not seem to be a disadvantage, or to interfere in any way with the properties of the compound. For these reasons it has not been deemed necessary to get rid of it.

It has been the practice, at the German Hospital, to designate distinctive compounds and substitutes for proprietary preparations with a more or less original and descriptive title, the object being to facilitate the writing of orders or prescriptions during the busy hours of the day, and to avoid, if possible, any violation of the existing patent or trade-mark laws of the country. Following this established precedent, the name or title decided on for this mixture was a combination of the initial parts of the words petrolatum and oxygen, and it is as "Petrox" that we shall refer to this compound in the remaining portion of these remarks.

Petrox, in addition to its solvent action on many of the more active medicinal compounds, also facilitates the absorption of these drugs when applied to the skin or mucous membranes. The exten-

sive employment of a number of the possible compounds has demonstrated their usefulness in quite a variety of ways. To enumerate some of these, we may say that, as a simple lubricant for massage, this combination offers the advantage of being smoother and more slippery than many simple oils, more cleanly than starch or talcum, and in addition to this, any excess is readily washed away with soap and water.

As a liniment, it makes a good vehicle for the administration of such drugs as chloroform, camphor, turpentine or any of the volatile oils. As an inunction, it facilitates the absorption of such active remedies as iodine, creosote, guaiacol, ichthyol and salicylic acid. As a local application it is useful, and makes an excellent vehicle for such drugs as iodoform, beta-naphthol, sulphur, tar and carbolic acid. In addition to this, it may be used as a vehicle for the internal administration of such drugs as iodine, guaiacol, creosote and many other more or less caustic and irritating drugs and compounds.

When any of these preparations are to be taken internally, the patient should be directed to put the required dose of the petrox compound into a bottle with the required amount of water or other liquid, and give the mixture a vigorous shake, so as to thoroughly incorporate or emulsify the active ingredient or drug with the liquid.

In addition to this liquid petrox, a solid form, to be used as an ointment base, is readily made by substituting a hard petrolatum for the liquid. For this solid preparation sufficient heat must be applied to melt the petrolatum, the oleic acid is then added, and just before the mixture has cooled sufficiently to set, the spirit of ammonia is added, and the whole mass is then stirred until cold. This mixture answers admirably for ointments where the absorption of the active medicinal ingredient is the chief object sought, and, therefore, it may be used to advantage with such drugs as mercury, potassium iodide, sodium salicylate and many others.

There are interesting possibilities in any or all of these combinations and the base itself is sufficiently inexpensive to warrant the making of a quantity by the pharmacist, and in turn calling the attention of his neighboring physicians to its possibilities, advantages as a vehicle for the external and also internal administration of many active drugs.

FEBRUARY, 1901.

PHYSICAL AND CHEMICAL EXAMINATIONS OF OIL OF SANDALWOOD, LAVENDER AND THYME.

By Lyman F. Kebler.

The quality of an essential oil is influenced in many ways, the locality in which the plant is grown, nature of the soil, humidity of the air, drought, elevation, cultivation, methods of distillation, etc. For example, lavender oil prepared from flowers grown in the lower mountainous regions of the Alps is inferior to that distilled from flowers collected at an elevation of 5,000 feet, and the oil obtained from flowers cultivated in England is of a much different quality than that made from the wild alpine flowers. Prolonged distillation undoubtedly has a marked influence; oxidizing some products and decomposing others. Mr. H. Laval,[1] in a very interesting and instructive paper on lavender oil, deals, in part, with the various distillation methods employed, and according to his observations it would not be surprising to meet with as many qualities of oil, from the same locality, as there are methods of distillation employed.

In order to differentiate between good and poor oils, the nasal organ as well as physical and chemical methods are resorted to. A well trained and experienced nose is probably very difficult to dispense with in selecting oils for certain kinds of preparations. We are, however, coming more and more to determine the value of an oil by the amount of the most essential constituent contained in it. Just as the per cent. of morphine determines the value of opium, or quinine that of calisaya bark, or strychnine nux vomica, so the amount of cinnamic aldehyde determines the value of oil of cassia, and linalyl acetate and santalol are valuable factors in determining the quality of oils of lavender and sandalwood, respectively. But even here we have conflicting opinions; for example, one source of information tells us that the higher the per cent. of ester the better is the oil, from another source we learn that an extended investigation shows that an oil containing from 25 to 30 per cent. of ester is superior to an oil containing from 35 to 40 per cent. or over. There are certainly good reasons for such differing views. The high testing ester oil may have had its aroma injured in some way as by distillation or careless keeping, or certain esters may have been added to an inferior oil to bring up the per cent. of ester. Again,

[1] 1886, *J. de Pharm. et de Chim.*, 5, 13, 593.

some of the celebrated English lavender oils contain but a low per cent. of ester, which would indicate that the ester is not the only factor to be considered in selecting an oil. In fact it happens occasionally that the nose and the per cent. of ester are entirely at variance with each other on oils obtained from the same locality.

During the past year the writer has had occasion to examine a goodly number of the above oils and herewith gives the results of his work.

OIL OF SANDALWOOD.

This oil is probably looked on with more suspicion than any other. It is claimed by some that in order to be sure of getting the genuine article it was necessary to resort to manufacturing it themselves. The writer's experience has been that reliable manufacturers handle the genuine article. That an oil is pure can readily be determined, for the physical and chemical constants have been so thoroughly worked out that there cannot be much doubt of their reliability; these are, specific gravity at 15° C., 0 97 to 0·978, readily soluble in five volumes of 70 per cent. alcohol, optical rotation from — 17 to 19° at 25° C. in a 100 millimetre tube, santalol at least 90 per cent.

Sample No. 1, in the table following, was made by the writer from a wood that yielded 5·5 per cent. of oil, and it can readily be seen that the constants obtained fall well within the above limits. The methods for obtaining the above constants are simple and easily available, except the one for estimating the santalol, which will be given here.

Into a flask, provided with a reflux condenser, place 20 grammes of the oil, add an equal volume of acetic anhydride (not anhydrous acetic acid) and 2 grammes of fused sodium acetate; then gently boil for about two hours. Wash the mixture first with water, then with a solution of sodium hydrate, then with water again; finally dry the resulting oil with anhydrous sodium sulphate. Of this dried product, place from 2–5 grammes into a flask provided with a reflux condenser, add an excess of normal alcoholic potassium hydrate, and boil for half an hour. Ascertain the amount of alkali consumed by titrating back the excess, with normal sulphuric acid. From the data thus obtained the amount of santalol is readily calculated by the following formula:

$$P = \frac{a \times 22{\cdot}2}{s - (a \times 0{\cdot}042)}$$

P = santalol; a = number of c.c. of normal alkali consumed; and s = the amount in grammes, of the acetylized oil, used for saponification.

The following equations represent the reactions involved:

$$C_{15}H_{25}OH + (C_2H_3O)_2O = C_{15}H_{25}O.COCH_3 + CH_3CO_2H$$

Santalol + acetic anhydride = Santalol acetate + Acetic acid.

$$C_{15}H_{25}O.COCH_3 + KOH = C_{15}H_{25}OH + CH_3CO_2K.$$

Santalol acetate + Potassium hydrate. = Santalol + Potassium acetate.

The samples of oil examined gave the following results:

Number.	Specific Gravity.		Per Cent. of Santalol.	Optical Rotation.	Solubility in 70 Per Cent. Alcohol.	Santalol Esters. Per Cent. of.
	15° C.	25° C.				
1	0·9767	0·9724	97·16	—17° 15′	1 in 5	3·06
2	0·9727	0·9707	93 64	—18° 16′	1 in 5	4·10
3	0·9747	0·9739	91·70	—14° 56′	1 in 5	2·93
4	0·9666	0·9601	90·12	—	1 in 5	1·48
5	0·9716	0·9685	92·87	—17° 2′	1 in 5	1·43
6	0·9626	0·9600	75·00	— 7° 4′	1 in 5	2·67
7	0·9721	0·9681	96·34	—16° 36′	1 in 5	—
8	0·9713	0·9678	94·53	—16° 56′	1 in 5	3·61
9	0 9734	0·9696	90·87	—13° 48′	1 in 5½	—

Remarks.—No. 6 is undoubtedly adulterated. Nos. 3, 4 and 9 fall below the standard, yet the analyst would hardly call them adulterated, but rather of secondary quality. The percentage of ester does not appear to be a deciding factor with these.

OIL OF LAVENDER.

An examination of four samples gave the following results:

Number.	Specific Gravity at 15° C.	Solubility in 70 Per Cent. Alcohol.	Optical Rotation.	Per Cent. of Ester.
1	0·8985	1 in 3	—6° 6′	25·70
2	0·8989	1 in 3	—2° 54′	34·36
3	0·8892	1 in 3	—5° 9′	31·42
4	0·8830	1 in 3	—3° 41′	28·29

The above samples all represent oils of good quality.

According to Gildemeister and Hoffmann, lavender oils are divided into two classes, those containing at least 36 per cent. of esters and those containing from 30 to 36 per cent. of esters. This classification includes only the finest oils from certain localities. The same authorities say that an oil containing less than 30 per cent. of esters is mostly adulterated. This latter statement is probably too sweeping, because it is well known that oil of lavender is met with that contains as low as 10 per cent. of esters, yet is not adulterated and ranks extremely high in quality.

The method employed for estimating the esters is described in the latter part of the above process for determining santalol, and the chemical reaction is represented by the following equation:

$C_{10}H_{17}O.COCH_3$	+	KOH	=	$C_{10}H_{17}OH$	+	CH_3COOK.
Linalyl acetate	+	potassium hydrate	=	linalool	+	potassium acetate.

The molecular weight of linalyl acetate is 19·6, and the per cent. of ester, x, can readily be calculated by the following formula:

$$x = \frac{19{\cdot}6 \cdot \frac{y}{2}}{z};$$

y represents the number of cubic centimetres of semi-normal alkali used in saponifying z grammes of oil.

OIL OF THYME.

There appears to be little genuine oil of thyme on the market, but can be obtained if desired. Most of it seems to be adulterated with turpentine. This is especially true of the white, which seldom contains as much as 5 per cent. of phenol bodies. Genuine oil of thyme has been found to possess the following properties: soluble in from 1 to 2 volumes of 80 per cent. alcohol, specific gravity 0·900 to 0·935 at 15° C., and the content of phenol bodies varies from 20 to 30 per cent. Several oils examined of late gave the following results:

No.	Kind.	Specific Gravity at 15° C.	Solubility in 80 Per Cent. Alcohol.	Per Cent. of Phenol Bodies.	Optical Rotation.
1	White	0.877	Insol. in 20 volumes	2·55	—
2	"	0·881	" " 20 "	4·26	—
3	"	0·863	" " 10 "	None	—
4	"	0·8964	Sol. " 2 "	4·	— 3° 48′
5	"	0·8935	Insol. " 10 "	27·	— 3° 48′
6	Red	0·907	Sol. " 2 "	25·56	— 1° 24′
7	"	0·880	Insol. " 10 "	8·73	—
8	"	0·893	" " 10 "	18·81	— 1° 6′
9	"	0·916	Sol. " 1¾ "	30·16	— 2°
10	"	0·9231	Insol. " 10 "	19·00	—
11	"	0.9084	Sol. " 2 "	14·	+ 1° 48′
12	"	0·9074	" " 2 "	24·	— 1° 30′

No. 10 was an extremely muddy looking oil. While attempting to estimate the per cent. of phenol bodies in No. 3, it was noticed that the volume of the oil increased by 2 per cent. rather than decreased. When " white thyme " is called for, almost anything must be expected. The data for Nos. 4 and 5 are so different from any ever examined that strange queries arise in one's mind. No. 5, 27 per cent. phenol bodies, yet insoluble in ten volumes of 80 per cent. alcohol; contrast with this the corresponding data of No. 4, and observe that the gravities and optical rotations are practically the same. How can this be harmonized?

Of the red oils Nos. 6, 8 and 12 can be considered genuine, but 8 and 10 must be rejected with reserve.

The per cent. of phenol bodies was estimated by partially filling a 100 c.c. nitrometer with a 5 per cent. solution of sodium hydrate, then introducing 10 c.c. of the oil to be examined, shaking well for five minutes, and finally setting aside for twenty-four hours. The drops adhering to the nitrometer can be, in part, loosened by rotating or tapping the nitrometer. When the solution has become clear the non-phenol oil can readily be read off and the percentage calculated.

Laboratory of
Smith, Kline & French Company.

TECHNIQUE FOR THE RECOGNITION OF CERTAIN ANIMAL PARASITES IN MAN.

By L. Napoleon Boston, M.D.

Bacteriologist to the Philadelphia Hospital, Demonstrator in charge of Clinical Laboratory, Medico-Chirurgical College.

Anchylostoma Duodenale.—The condition produced by this parasite, when present in the intestinal canal of man, is known as brick-makers' disease, or tropical anæmia. Ova of this parasite are found in the feces of infected persons, and their detection is readily accomplished in the following manner: To a small portion of a recently voided stool, sufficient water is added to produce a cloudy liquid, when the stool and water are thoroughly mixed. A portion of the mixture is placed into a test tube and either centrifugated, or allowed to stand for a few hours. A portion of the sediment thus collected at the bottom of the tube is lifted by means of a pipette, and a drop of it placed on the center of a slide, when it is covered by a second slide or a large coverglass. The specimen is now ready for examination and should be studied under a $\frac{2}{3}$ lens, where the ova appear as small, round, opalescent bodies. Individual ova may be studied under a higher power lens—$\frac{1}{5}$ to $\frac{1}{8}$ (*Fig. 1*). These ova are well preserved when mounted in cast medium[1] or in glycerine.

After the administration of certain drugs, the adult worm appears in the feces as a silky, slightly curved thread (*Fig. 1*) whose color is not constant. The parasite's detection is facilitated by adding water to the feces and stirring to effect a perfect mixture which is then poured into a clear glass dish 10 x 12 x 3 inches, which is then set on either a light or dark surface. A thin spread of diluted feces is in this way produced, and affords a favorable field upon which to find the parasite.

The adult worms you see in the small bottle have been preserved in 70 per cent. alcohol. These specimens shown under the microscopes, were first placed in alcohol, and later in glycerin for twenty-four hours, from which they were mounted in cast medium. Glycerine jelly is also a valuable mounting medium for animal parasites.

The anchylostoma is known to be the cause of a large percentage

[1] Formula for cast medium, Journal, April, 1900.

of deaths occurring in tropical districts, and is of especial interest since Surgeon B. K. Ashford (United States Army[1]) has shown it to be most common in Porto Rico, and other of the West Indies.

Tape Worms.—Segments of these parasites are commonly passed with the stool, and their study and general characteristics differ in no way from where the parasite is expelled as a result of therapeutic measures. The freshly voided segments are first washed in water and then placed in 70 per cent. alcohol for twenty-four hours, when they are transferred to xylol for twenty-four hours and then mounted as follows: A portion of a segment is placed on a slide,

FIG. 1.—Anchylostoma duodenale. (1) Natural size; (2) head and neck (B. L., ⅔); (3) tail (B. L., ⅔); (4) ova (B. L., 1/6).

and teased to shreds. After a short exposure to the air (five minutes) a drop of Canada balsam is added and on it a coverglass placed. Prepared in this manner the ova are readily seen through a ⅔ lens, and when viewed under a 1/6 lens, both their outline and and structure are apparent. Staining is accomplished by Delafield's hæmatoxylin and other dyes, but adds little, if anything, to the specimen's value. Study of the segment in its entirety is most interesting, but scarcely necessary in clinical work. It may be accomplished by placing a segment between two slides and clamping them

[1] *New York Med. Jour.*, April 14, 1900.

tightly together. Under a ⅔ lens the segment may be studied, showing the uterus stuffed with ova.

To Detect the Head.—This being the portion of the parasite's study wherein most failures are experienced, and to which most importance is attached, I shall consider under the following heads: (1) Empty the bowels, by means of salines, so that no undigested food remains in the alimentary tract; (2) the administration of a vermicide; (3) follow in four to six hours by another saline; (4) when it is observed that the worm is beginning to escape from the rectum,

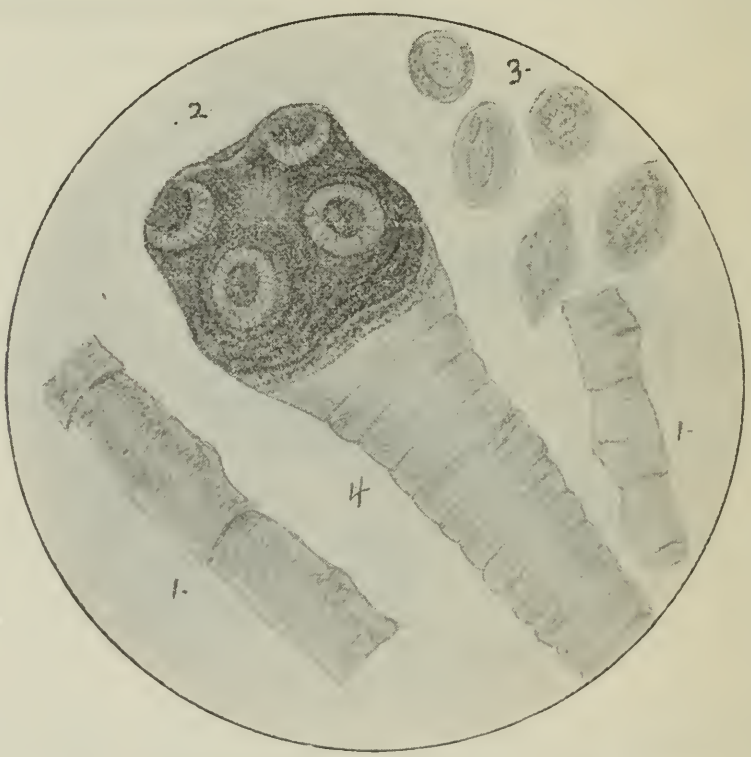

FIG. 2.—Tapeworm. (1) Natural size of segments; (2) head and neck (B. L., ⅔); (3) ova (B. L., ⅙).

the patient is directed to occupy a comfortable seat where the worm can pass into a clean vessel containing water; (5) all important is it that the patient sit on one commode from the time he observes that the worm is diminishing in size, until the entire worm is passed; (the nearer the head, the smaller are the segments), when within a few inches, 10 to 12, of the head the worm appears as a pale slightly flattened thread and its segments are not distinct; (6) the head is the last portion of the worm to be passed, and as long as any part of the parasite is protruding from the rectum the probabilities are that the head has not yet escaped.

Given a specimen collected in this manner, add to it a quantity of water, stir gently with a glass rod, after which it will be seen that the worm falls to the bottom of the vessel, when decant one-half, or more, of the liquid, which is replaced by clean water. This washing is repeated until the worm is cleansed. The worm, with the water surrounding it, is now transferred to a clear glass dish 10 x 12 x 3 inches, which is placed on a white surface (towel) and all large segments are removed by a glass rod, drawing them over the edge of the dish, when they are allowed to fall into a second dish containing water; care being taken not to break the parasite.

After all large segments are removed, the head is usually readily detected, by the naked eye, floating amongst the remaining thread-like portions of the parasite. In searching for certain small parasites a hand-glass may be found of service. The head is transferred to 50 per cent. glycerine and preserved for further study. In mounting parasite heads, a slide provided with a concavity of sufficient depth to accommodate their thickest portion, is most satisfactory. They are well preserved when mounted in Farrant's medium, cast medium, glycerine and glycerine jelly (*Fig. 2*).

Tænia Echinococcus (*Dog Tape Worm*).—Here the problem is somewhat different, as man is the intermediary host, and in him develops the head, or scolex of the parasite only. Each head is provided with a crown of hooklets, and many free hooks are often seen in connection with shreds of finely granular, yellowish membrane (*Fig. 3*). Hooklets, scolices and membrane from the cysts of the echinococcus are occasionally found in sputum, pus from abscesses, the fluid of cysts, feces and urine. Hooklets are best studied under a 1/6 lens, while the heads may be detected under a much lower power. It is these findings which enables one to recognize the parasite, and the hooks may be the only evidence present. In the study of this parasite a low power of illumination is necessary, and the skilful manipulation of both Abbe condenser and iris diaphragm afford great assistance. Products of the echinococcus may be mounted in any of the above mounting mediums.

Trichina Spiralis.—The larvæ of this parasite appear in the muscular tissue of man after the ingestion of uncooked, infected pork. They make their appearance early in the diaphragm, frontal, and muscles of the leg. The material to be studied is collected by the

physician in the following manner: The site of incision is over the outer head of the gastrocnemius muscle, and after this area is surgically cleansed the parts are anæsthetized by injecting a solution of cocoaine hydrochlorate. First inject the skin and then the deeper structures down to the sheath of the muscle. When anæsthesia is produced an incision is made dividing all tissues to the muscle's sheath, which is grasped by a rat-tooth forceps and incised, after which a small portion of the muscle is dissected and placed in a vessel containing water. Glycerine and alcohol arrest all movements of the parasite. The wound is now closed and dressed antiseptically. A small piece of this tissue is placed on a slide and teased, by means of fine needles, until most of its fibres appear to be separated. The

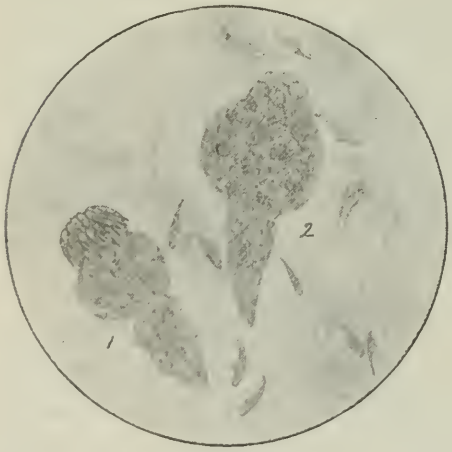

FIG. 3.—T. echinococcus. Scolex and hooklets (B. L., 1/6).

FIG. 4.—Trichina spiralis in muscle from outer head, left gastrocnemius. Twenty-first day of disease (Queen, 2/3).

addition of a few drops of water to the specimen renders the teasing process less difficult. The slide is now viewed under a low power (2/3), and if trichinæ are present their recognition is easy (*Figs. 4* and *5*); however, a very low illumination is required. After a few weeks the trichina become incapsulated by the patient's tissues, when they appear as small solid bodies showing a parasite tightly coiled in their centre. Trichina are also well preserved by any mounting medium containing glycerine.

Distoma Hæmatobia (*Bilharz*).—The adult parasite is probably located in the veins of the bladder, and there deposits its ova which find their way into the bladder or bowel, and appear in the urine or stools. Bilharz's parasite is a common cause of bloody urine in

certain geographical districts. To detect the ova allow the urine to stand until all blood clots are collected at the bottom of the tube; (2) lift a portion of this sediment into a pipette and place a drop on the centre of a slide; (3) tease the clots as fine as possible, and evaporate nearly to dryness; (4) add a drop of cast medium, or glycerine, to the centre of the specimen upon which place a cover-glass and spread the medium by additional pressure. The specimen should be placed on a flat surface for twenty-four hours while the mounting medium hardens, after which time a permanent ring may be added. For rapid diagnosis the specimen may be mounted in water. Detection of these ova is best accomplished by the $\frac{2}{3}$ lens (*Fig. 6*). Individual ova may be studied under a higher power, when

FIG. 5.—Trichina spiralis. Eighth week of disease.

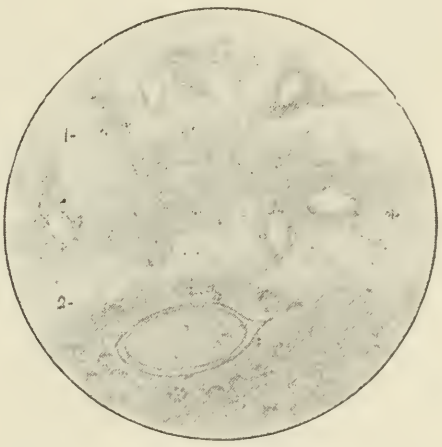

FIG. 6.—Bilharz's parasite. (1) Ova (B. L., $\frac{2}{3}$); (2) ova (B. L., $\frac{1}{6}$).

it is often possible to distinguish the contained embryo which varies in its appearance with the age of the egg. Influenced by temperature, these embryos are freed from their shell in from a few hours to several days after they are passed with the urine. The most immature ova are about $\frac{1}{400}$ inch in length and $\frac{1}{600}$ inch in breadth, while fully matured ovum measures $\frac{1}{280}$ inch in length and $\frac{1}{325}$ inch in breadth. The study of ova in feces needs no special explanation.

THE VOLATILE OIL OF BUCHU, according to Kondakow and Bachtschiew, consists of (1) a mixture of limonene and dipentene (10 per cent.); (2) menthone (60 per cent.); (3) diosphenol, (20 per cent.); (4) resinous matter, (5 per cent.).—*Ph. Zeit., 1901, 194.*

PHOTOGRAPHIC DEVELOPMENT BY GAS LIGHT.

By William S. Weakley, P.D.

Before entering upon the practical part of this subject, it might be well to first consider the basis upon which we work to obtain certain definite results. These results come about by the chemical action of light rays upon the photographic dry plate, which consists of a glass plate or celluloid (films) coated with a silver bromide gelatin emulsion.

Upon exposure to light the silver bromide particles in the plate are more easily converted by the reducing solution (developer) into metallic silver than those which have not received this exposure. We find that by too long a development, or by using too strong a developer to start with, the unexposed silver bromide is also changed; for this reason development or the reduction of the silver bromide can only be carried on to a certain point.

The next subject to be considered is the use of the developer or reducing agent which brings about this change. These agents may be divided into two classes, namely, slow and rapid; an example of the former class we find in hydrochinone, and of the latter we find in pyrogallol. In using a rapid developer exposures must be correspondingly correct, for if they are not the reducing solution acts too quickly upon the unchanged silver bromide and hence a fog, or as expressed by Professor Nipher,[1] the zero point is approached, if not already reached. With a developer like hydrochinone in its normal alkaline combinations we have a typical slow developer whose rapidity is materially increased by replacing the sodium carbonate by potassium or sodium hydrates. This developer not only enables one by its delay in reducing the silver bromide to judge an over-exposure and remedy it by potassium bromide, but also assists quite materially in stopping the development at the proper time, thus preserving details.

The author of this paper had his attention called to the fact that Prof. Francis E. Nipher, of the University of Washington, was trying to turn our former ideas of the principles of photography upside down, and at the suggestion of Professor Kraemer the substance of Professor Nipher's paper was investigated and some

[1] "Positive Photography with Special Reference to Eclipse Work." Presented to the Academy of Science of St. Louis, October 15, 1900.

original experiments carried out, with the principles therein laid out as the basis.

We have in the sensitive film, three stages or conditions, namely: the negative, zero, and positive conditions.

With the negative stage our plate is exposed the normal time, which depends upon six things.

(1) On the weather.
(2) On the brightness of object to be taken.
(3) On the time of day and season.
(4) On the amount of light transmitted by the lens used.
(5) On the size of aperture.
(6) On the sensitiveness of the plate.

These six conditions with the dark room fix the basis upon which negative photography is produced, the failure to take any one of these conditions into consideration will mean failure either one way or the other, *i. e.*, undertimed or overtimed; the former condition meaning a thin and contrasting negative, the other a dense and non-contrasting negative or fog; this fog, when perfect, is our zero point, or where the negative merges into the positive condition.

Then an over-exposed negative may be an under-exposed positive, but cannot be an over-exposed positive. This sufficiently overtimed negative or positive must now be developed in the light, so as to carry it farther and farther away from the zero condition; therefore, the nearer the zero condition is approached, the stronger the light must be during development, so as to carry it farther away from this condition.

The application of positive photography is obvious when we consider the liability of over-exposure, especially in such important work as eclipse or microscopic photography; think for a minute of the occurrence of an eclipse which perhaps may not be seen again for centuries, and the application of this new process will be apparent. Its value is inestimable when we consider that the ordinary negative is almost invariably over-exposed for fear that it will be thin and lacking in detail, which condition in a negative is not desired; in fact it becomes all but useless, and were it over-timed and developed as a negative the mere fact that potassium bromide would have to be used in large quantities especially in greatly overtimed plates the corresponding result would be lack of detail, or that condition which was most sought for is destroyed to a greater or less

degree. Any professional or thoughtful amateur photographer will see the application.

In the experiments which were carried out the aperture was set at eight, the lens used was B. and L.'s double rapid rectilinear lens. All exposures made were in bright sunlight, with rapid plates.

After exposure the plate is taken into a room free from daylight and is developed about 8 inches below the mantel of a Welsbach light or between two other strong lights, whether electric, oil or acetylene. The developer should be kept ice cold to obtain the best results. In transferring the plates from the holder to the developing tray it is advisable to remove them in the shadow or better underneath the developing table and quickly transfer them to the developer in the tray.

The plate before entering the developer is of a yellowish color, and if exposed sufficiently shows very faint outlines of the object photographed. This image disappears upon entering the developer and then reappears as a reddish-brown image, gradually turning to the normal grayish-black color of the ordinary negative. These positives can be reduced in the ordinary way with potassium ferricyanide and hyposulphite of soda.

A set of exposures was made as follows :

1 . . . . . $\frac{1}{50}$ second. Normal exposure for negative.
2 . . . . . 1 minute.
3 . . . . . 3 minutes.
4 . . . . . 4 minutes.
5 . . . . . 30 minutes.
6 . . . . . 60 minutes, 180,000 times normal exposure for negative.

The above were developed with the following formula :

SOLUTION NO. 1.

	Ounces.	Grammes.
Water	25	1,000
Hydrochinone	3	126
Sodium sulphite cryst.	½	21

SOLUTION NO. 2.

Water	25	1,000
Sodium carbonate cryst.	6	252

Mix the two solutions in equal parts, dilute with three to five times its bulk of water. If a few drops of a 10 per cent. solution of potassium bromide be added it will give brilliancy to the plate but will not assist in improving detail.

The appearance of the above exposures upon development was as follows:

1. Faint image appeared gradually fading and leaving a fog.

2. Image appeared, but upon further development became very slightly foggy.

3, 4, 5 and 6 showed very little difference in density or detail.

LIQUID CARBONIC ACID GAS.

HOW IT IS MADE AND PUT UP FOR SODA FOUNTAIN USE.

By Frederick T. Gordon.

How many druggists are there who know how the liquid gas they are now using for charging their soda water is made, or how it is put into the heavy iron "tanks" in which they have it delivered to them? Now that this liquid gas is rapidly supplanting the old way of making gas in the cellar from various materials or even the buying of soda water already charged, there is every reason why the druggist should know the ins and outs of his supply if he would be able to talk intelligently on it to the inquiring customer. And this is easy to do, too, for the whole operation of making the gas, liquefying it and filling the fountain tanks, is very simple and easily understood.

Liquid carbon dioxide is now as much a matter of commerce as is carbonate of soda, and there are a number of firms in this country making it, from many different materials and in many different ways. The manufacture of the gas may be classed under three general processes: Driving off the CO_2 by heat from various carbonates, such as limestone, dolomite, etc.; this is a process that is confidently stated by authorities to be the one that promises the best returns in the future; formation of the gas by the interaction of acids on carbonates is another, the most common of which are the use of marble and sulphuric acid and bicarbonate of soda and sulphuric acid; while the collection of the gas formed in breweries by fermentation or from burning coke or coal is a process that is rapidly assuming great importance. Considerable CO_2 is now collected from the natural spring waters at different points, the largest manufactory of this kind being at Saratoga Springs, New York.

In this country the collection of gas formed by fermentation in the process of brewing has, as yet, assumed little importance, but when the use of liquid carbon dioxide becomes more general as the motive power of machinery there is little doubt that the valuable by-product now being wasted will be carefully collected by the brewers.[1] The same wilful waste of valuable source of power is also notable in the vast coking industry of this State, thousands of tons of gas going to absolute waste every day in the coke fields, just as in former days tar was considered as not being worth collecting. But when the use of liquid gases as a source of power is made practically possible by improvements in liquid-gas engines we may look to see this "by-product" as carefully and jealously saved as is now the tar from gas works. Another fact to be borne in mind is that when we make use of the gas from combustion, collected and liquefied from the stacks of our factories' countless chimneys, we add to the amount of power possible from coal an economy of material and energy of incalculable amount.

At the present time, the uses of liquid carbon dioxide are chiefly for refrigerating purposes and for charging soda water, so there is not sufficient demand for special inventive genius as yet; indeed, so limited are these uses and so keen the competition that were it not for the "by-products" of manufacture it is possible that the druggist would not yet have this convenient means for making his soda water. The value of these by-products is what makes the cost of liquid gas so small, if it were made and sold simply by itself the cost would be many times greater than it now is. As chemistry makes further strides, we may look for even cheaper gas, as more and more by-products are made use of, the most likely sources being the gas from the burning of limestone to make lime and the collection of the gases of fermentation. The subject of these by-products is too large to be taken up in this short paper, being almost a review of a dozen different industries in itself.

By whatever process it be made, the liquid CO_2 intended for charging soda water must be purified before it is fit for use, there usually being more or less impurities in it that render it unsafe in its crude state. This purification is also of importance in reducing

[1] Large quantities of liquid CO_2 are now imported chiefly from Germany, in tubes holding 200 or 300 pounds. This is collected from breweries there and liquefied for commercial uses and exports.

the cost of liquefaction, a pure dry gas being liquefied with less trouble and cost than a wet impure quality. Usually, the gas is generated in large iron retorts or tanks, when made by chemical action, or in specially made tank-like retorts when made by the action of heat on carbonates; from these it is pumped through coils of pipes surrounded by water through the "purifiers" and "driers" to the first compressor. The "purifiers" are large tanks full of water through which the gas bubbles up just as in the familiar wash-bottle for gases of our laboratories, and is pumped off as it comes through to the "dryer." The best grades of liquid gas are washed four times by being passed through as many separate tanks of water. From the purifiers, the gas is made to pass either through sulphuric acid or over calcium chloride to remove all moisture, this interfering seriously with the compression; in this part of the process there are several trade secrets as to the way and materials used.

After having been washed and dried, the gas, still in its normal state, is pumped to the first compressor, where it is condensed under a pressure of about 200 pounds to the square inch; from this it passes through coils of pipe immersed in a freezing mixture of ice and salt to absorb the heat of compression and comes to the second compressor at a temperature little above 0° Centigrade. The amount of heat generated in the compression of gases is amazing to the unitiated; to absorb it and cool the gas requires a large quantity of ice daily. In the second compressor, the gas is brought to a compression of 540 pounds to the square inch, the pipes of which are also surrounded by a freezing mixture, and passes into a coil of pipe immersed in the same. The gas is still in a gaseous form, but now physical effects begin to play their part and cause it to liquefy by its own expansion. The end of the final coil of pipes is connected directly with the "tank" or cylinder in which the liquid gas is sold to the druggist. The process by which these tanks are filled is extremely interesting and simple.

If you will examine a tube of liquid gas you will see screwed into the top a piece of heavy brass pipe, with a valve for opening or closing the tube at the top (worked by a wrench) and a threaded tube on one side. The pipe connecting with the soda founts is screwed on to this threaded bit of pipe on the side. Inside of this brass pipe, the bore turns at right angles to the bore of the side

opening, at the bottom this bore terminates in a small piece of pipe closed at the bottom and having numerous very minute perforations. The valve by which the tube is opened or closed is a long piece of metal, terminating in a needle-like point, which, when screwed down on the valve seat, closes the opening just below where the side bore issues out. In this arrangement lies the whole secret of the liquefaction of the gas. The gas is let into the tank through the side opening at a pressure of 540 pounds, it escapes inside through the minute openings at the bottom of the bore in the form of a fine spray, and by this sudden expansion lowers the temperature so greatly and rapidly that the incoming gas is at once liquefied and trickles down the sides of the tank. The process is a continuous one, the compressed gas being supplied until the tube is full, shown by the reading of the pressure gauge outside being the same as at the last compressor, 540 pounds, for as fast as the gas is permitted to flow into the tube and escape through the perforated bit of pipe it liquefies itself, the compression being of course kept up at the initial degree. During this process the tubes are surrounded by a freezing mixture to aid in the condensation of the gas by absorbing any heat from compression in the supply pipes.

In some factories, the tanks, tubes or cylinders, all names for the container of the liquid gas, are partially exhausted of air before filling; in others the air is left in, of course making a slight difference in the amount of liquid gas the tube can hold. Another important point to the druggist is the dryness of his liquid gas; very often, especially where the liquid gas is sold at a low figure, the gas is not dried before compression, and there is often a quart or more of water found in every tube filled with wet gas. This freezes as soon as the gas begins to be drawn off and sometimes creates a great deal of trouble by collecting in the exhaust pipe in the form of solid ice, or fine crystals, and blocking up the outlet; hence the druggist should insist upon receiving only liquid gas that has been well dried before it is liquefied, to save annoyance and loss in paying for a pound or two of water and ice at the price of liquid gas.

The ordinary size of tanks contains from twenty to twenty-two pounds of liquid CO_2, but there are other sizes that contain almost double the amount. The old style tank was made of cast steel and could sustain a pressure of 3700 pounds to the square inch; the newer tanks are made of a mild steel that can stand a pressure of

15,000 pounds. When the tanks are taken out of the freezing mixture and come to the temperature of surrounding air, the pressure of the gas inside is about 900 pounds to the inch in winter and 1100 in summer, and there is also a varying development of pressure inside when the gas is being drawn off for use. Under almost all circumstances, these tubes of liquid gas are perfectly safe to handle and will stand a great amount of jolting, yet there are conditions when the critical temperature of the liquid gas is passed and it assumes the gaseous form inside the tube, and then a seemingly slight cause or weakness in the steel will cause a disastrous explosion. It is well to be on the safe side and to handle these tubes carefully and not to open the valve too suddenly, a gradual opening until the pressure gauge stands at the desired pressure being safest. The small size cylinders are about 3/8 to 1/2 an inch in thickness of their steel walls and weigh, when filled, from fifty to seventy pounds.

It is of course understood that the process I have just mentioned is the particular one used in the Philadelphia plant I visited; there are other methods, of later date, by which greater economy of time and material are achieved, the method of the Liquid Gas Company, for instance; but the essential principle is the same, the escape of CO_2 from fine orifices under pressure. In this plant I mention, an average of 15 horse-power working for 10 hours produces from fifty to eighty tubes full of liquid gas, according to the speed with which the compressors are run. These figures will differ greatly from those of more modern plants.

It must be borne in mind, when considering these figures, that when the gas is brought under a pressure of 540 pounds at 0° Centigrade and allowed to flow into the cylinders through the specially devised arrangement described above that it in great part liquefies itself by its expansion.

This, of course, is because the gas escaping suddenly from a great pressure to that of the atmosphere requires a great deal of heat in its expansion and this heat it takes from the gas immediately following it, thus bringing the temperature down low enough to cause its liquefaction under the pressure it is sustaining. This principle is now widely used in the liquefaction of all gases, such as air, hydrogen, etc., it being practicable to liquefy air by allowing it to escape from minute openings under high pressure into the open atmosphere.

The process whereby the water in the founts is charged with the gas is too familiar to the druggist to be of interest here, so this article will be concluded with the advice to the druggist to discard his old style marble-dust generators as soon as he can and use the cleaner, surer and more economical liquid carbon dioxide and get the most sparkling pungent soda water through his draught tubes.

CORRESPONDENCE.

PROCTER MEMORIAL.[1]

In response to a letter from the editor of this JOURNAL concerning the feasibility of establishing a research laboratory as a memorial to the life and work of Professor William Procter, Jr., by the American Pharmaceutical Association at its semi-centennial in 1902, the following are some of the replies which have been received:

DEAR SIR:—I am very glad to see that the proposed establishment of a research laboratory upon the fiftieth anniversary of the A.Ph.A. is finding more and more favor. When I wrote you some months ago I should not have had the courage to advocate so much of an undertaking, but now I should like to have a good effort made for it.

ANN ARBOR, MICH. A. B. PRESCOTT.

DEAR SIR:—I earnestly favor the establishing of a research laboratory by the American Pharmaceutical Association. No better step could possibly be taken. There can be but very little progress for pharmacy except through the laboratory, and for the representative pharmaceutical association of the United States to recognize this fact and act accordingly would be to the profit and honor of the association and the profession of pharmacy. I hope the matter will be brought forward in a practical shape at St. Louis and wisely passed on.

INDIANAPOLIS, IND. J. N. HURTY.

DEAR SIR:—I am just in receipt of yours of the 1st ult., in reference to the establishment of a research laboratory. I do not know that I can add anything in regard to this matter beyond what

[1] For editorials and other correspondence on this subject, see this JOURNAL, November, 1900, and February, March and April, 1901.

was given in the Report on the Revision of the U.S.P. at the 1898 meeting.[1] This covers it all, and I have had no reason to change my mind. It would certainly be of great value to all interested branches if such a thing could be brought about. And possibly, if sufficient funds could be had to establish such a laboratory, means could be obtained by a system of charges, fees and published information to those who contributed to its establishment to maintain it.

The establishment of such a laboratory would go far in placing pharmacy on the road to that higher plane we are striving for.

It would seem to me that by a united effort on part of the A.Ph.A., sufficient pressure could be brought to bear on Congress to aid in its establishment.

South Bend, Ind. Leo Eliel.

Dear Sir:—Absence must be my excuse for not promptly answering yours of the 4th, respecting the establishment by the A.Ph.A., of a research laboratory as a memorial to the late Professor Procter.

To properly equip, build and endow such an institution would, in my judgment, require about two hundred thousand dollars ($200,000) —say building and ground, $25,000, apparatus and furniture, including books, $5,000, leaving $170,000 to be invested at 3 per cent., yielding an annual income of $5,100. I do not believe anything approaching this sum can be obtained.

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[1] In the Report of the Committee on Revision of the U.S.P. of the A.Ph.A, it is stated that:

"Your Committee further recommends the establishment of a scientific laboratory, employing chemists and pharmacologists by the year, to carry on investigations on the lines indicated by the National Committee. Such a laboratory would be of great benefit to the pharmacists and physicians of this country, as well as a great credit.

"It is the opinion of this Committee that a laboratory with all the modern equipments on a fairly large scale should be established at Washington, where the assistance of the Government chemists, library and facilities could be had; such laboratory to have facilities for the working of four or more chemists under the guidance of one of them as director, and for the working of one pharmacologist, who should have a separate but adjoining room to the chemical laboratory, and work conjointly with them under the guidance of the general director. If the Revision Committee has not sufficient money at its disposal and cannot obtain it, no doubt the pharmacists and manufacturing establishments of the country will make up the deficiency."—[See Proc. A.Ph.A., 1898, p. 225.—Ed.]

In considering this question, a proper regard should be had for the reputation of American pharmacy, as well as the honor of Professor Procter.

Whatever is undertaken should be clearly within the limits of our ability to do well and thus reflect credit on pharmacy while honoring one of its patrons. The disgrace which would attend failure in such an effort would be intensified rather than assuaged by ascertaining when too late, that our endeavors were aimed too high.

My suggestion, if one is permitted, would be to appoint the strongest committee possible; embracing all phases of pharmacy, and give this committee full power, first to solicit subscriptions and second, afterwards to decide on the character of the memorial.

WASHINGTON, D. C. W. S. THOMPSON.

PHARMACY LAWS AND LEGISLATION.

CONTRIBUTED BY PROF. J. H. BEAL, SCIO, O.

(Under this title it is designed to give each month a brief *résumé* of proposed and accomplished pharmacy legislation, and of decisions of importance to pharmacy boards and pharmacists. On account of space limitations, proposed legislation cannot be more than briefly mentioned, but bills enacted into law will be discussed and their principal features pointed out. Pharmacy boards and members of legislative committees and others are requested to send copies of such measures and news of this kind either to the editor of this JOURNAL, or to Prof. J. H. Beal, Scio, O.)

The flood of proposed pharmacy legislation still continues; the state legislature that has not at least two or three pharmacy bills pending is decidedly out of fashion.

NEW YORK.

New York still continues to be the storm centre of proposed pharmacy legislation. Among the measures which have not been previously reported in these columns, are the following:

As a result of the disastrous explosion in the drug warehouse of Tarrant & Co., of some months ago, a bill has been introduced into the Assembly to amend the present law regulating the storage of explosives. The measure was prepared by a committee of the drug section of the Board of Trade and Transportation, and prohibits the storage of the substances specified in any building part

of which is used for dwelling purposes, or in excess of the amounts specified, except in such places and in such manner as may be prescribed by the Fire Commissioner.

The Thornton Bill which strikes out the annual registration feature of the present law has passed the Senate, and is now in the lower branch of the legislature.

The Smith Bill, introduced by Assemblyman Smith, would permit druggists to register without examination on making affidavit of three years' experience.

The bill introduced by Senator Malby proposes to exempt pharmacists of the various state institutions from the provisions of the pharmacy law, probably on the ground that public office being a private snap, such a little thing as ignorance of one's duties should not be permitted to interfere with political appointments.

From the *Pharmaceutical Era* we copy the following: "A Buffalo man claims to have discovered a wonderful remedy for rheumatism, and in virtue of this discovery he feels that he should be entitled by law to practise medicine without passing the regular medical examination and fulfilling the other requirements laid down, and he has induced a State Assemblyman to introduce a bill for his relief in this respect. Another bill, which has been killed, however, was to permit an individual to practise veterinary surgery without fulfilling the requirements demanded by law."

The Costello Bill has been amended so as to deprive it of some of its more offensive features by the addition of the following new matter: "The Secretary of any division of the State Board of Pharmacy, having within his territory any such village or place, shall, whenever the necessity therefor is shown to exist, grant to some resident therein, who has had experience in dealing in drugs, medicines and poisons, a permit to compound medicines, fill prescriptions and sell poisons for a period not exceeding one year, and on payment of a fee not exceeding $300. Such permit shall be limited to the village or place in which such person resides, and may be limited to one or more of certain kinds or classes of poisons." The places or villages referred to are not to exceed 1,000 in population.

A notable bill, introduced by Assemblyman Morgan, provides that apprentices within one year of the beginning of their apprenticeship, shall appear before the Board and submit to an examina-

tion which shall show mental fitness equivalent to thirty-six counts chosen by the Board of Pharmacy from those required by the regents of the University of the State of New York from students in law, medicine and dentistry. Certificate of good character is also required.

Graduates of high schools, academies, colleges of pharmacy or other institutions recognized by the Board are to be registered as apprentices without examination. The fee for the apprentice's certificate is fixed at 50 cents.

ARKANSAS.

The manufacturers of alum baking powders who have been so thoroughly chevied by the cream of tartar people, are alleged to be resposible for the following bill which has been introduced into the legislature of the State of Arkansas: "Whereas, bitartrate of potash (cream of tartar) as used in combination with bicarbonate of soda for aerating or leavening or preparing farinaceous foods, does, by its chemical reaction, leave in such foods 9 per cent. tartrate of potash and soda (commercial strength) in combination or in such quantities as is believed to impair and undermine the health of many people who use it; therefore,

Be it enacted, etc., that the chemical known as bitartrate of potash (cream of tartar) shall not be sold or offered for sale either in combination with bicarbonate of soda or separately, for the purpose of aerating, leavening or preparing farinaceous foods, or used by venders of food products for aerating, leavening or preparing such food products."

The penalty for violation is fixed at $500 and six months imprisonment.

ILLINOIS.

The bill proprosed by the Committee on Legislation, amending the pharmacy law, has been introduced into the House of Representatives by Mr. Purdunn. The principal features of the bill are the provisions making examination fees non-returnable in case of failure, the prohibition of adulterations, and the appropriation of $10,000 for the expenses of the board.

Other bills are as follows:

A bill requiring proprietary medicines to be labelled with the formula of their constituents.

The Mueller Bill prohibiting the use of injurious substances in food preparations.

The Galligan Bill amending the present label law.

The Hunt Bill regulating the working hours of drug clerks in cities of 500,000 or more inhabitants.

The Helminiak Bill regulating the sale of baking powders.

PENNSYLVANIA.

The pharmacy bill in Pennsylvania has been defeated by the decisive vote of 155 to 12, its defeat being due almost entirely to dissensions among the druggists of the State.

It is also reported that a bill has been enacted which does away with the triennial registration feature of the old law, and also with the requirement of exposure of the certificate of registration. This is regrettable if true, as experience has amply demonstrated the fact that a pharmacy law is next to unenforceable without these provisions.

MASSACHUSETTS.

The Cook Bill, mentioned in the April number, and which sought to increase the liquor license of druggists from $1.00 to $500, has been defeated.

A petition has been presented to the legislature of the State for a law to permit all druggists who were entitled to registration at the time of the passage of the original pharmacy act to register as drug sellers, but not to compound prescriptions, without examination.

It is to be hoped that no such vicious measure will ever be permitted to become law. If the men for whose interest it is intended were too careless to register when they had the opportunity, and are still too ignorant to pass an examination in pharmacy, they are certainly too careless or too ignorant to be safe dispensers of drugs and medicines.

MAINE.

A bill has been introduced into the Maine Legislature granting druggists the right to sell liquors for medicinal, chemical and mechanical purposes, with certain restrictions designed to prevent an improper use of the privilege.

MICHIGAN.

A bill to prevent the improper sale of liquors by druggists, and providing for an assistant Secretary of the Board of Pharmacy, has passed the Senate.

MISSOURI.

The measure amending the Missouri Pharmacy Law so as to prevent the registration of physicians as pharmacists without examination has been made law.

The amendment, for a copy of which we are indebted to Dr. H. M. Whelpley, is as follows :

SECTION 1. Section 3037 of chapter 23 of the Revised Statutes of 1899, relating to druggists and their licenses, is hereby amended by striking out the words "*Provided*, that nothing in this chapter shall be construed to require any physician duly authorized to practise medicine in this State to submit to an examination as a condition precedent to a license as a pharmacist, but that the same shall be issued upon presentation of his diploma as a physician," so that the said section, as so amended, shall read as follows:

SEC. 3037. It shall be unlawful for the proprietor of any store or pharmacy to allow any person, except a registered pharmacist, to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to or under the supervision of a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be liable to a fine of not less than $25 nor more than $100 for each and every offense."

It is regrettable that the pharmacists of Missouri did not make use of this opportunity to procure the enactment of the form of law approved last year by the American Pharmaceutical Association.

The following, known as the Griffin Bill, has, according to the *National Druggist*, from which we copy, been introduced into the Missouri Legislature.

SEC. 3018a. In all prosecutions, either upon indictment or information, for the sale of intoxicating liquor under what is known as the dramshop act, and in all prosecutions for the sale of intoxicating liquor without license, it shall be sufficient for the State to show the sale of such intoxicating liquor, and *if the defendant*

admits such sale, it shall devolve upon him to show that he sold such intoxicating liquor legally; and it shall be no defense for the defendant to show that he was doing business under a merchant's license, or that he was *a registered pharmacist, a druggist, or the proprietor of a drug store, unless he shall show that such sale,* if made, *was made in conformity to the provisions of the law concerning merchants or druggists.*

As a druggist would necessarily admit a legal sale of liquor, he would stand *prima facie* convicted of crime under this section, and would be open to endless blackmail and persecution if it should become a law.

MINNESOTA.

The Hillmond Bill, which has the support of the prohibition interests, makes it a misdemeanor for a physician to prescribe more than two "apothecary ounces" of distilled, vinous, or malt liquors for any one person in any one day. If this should become a law, its effect would be to render illegal the use of alcoholic liquors in the class of cases in which they are of most benefit, while it would have little or no effect upon the improper use of liquor by those who are determined to possess it.

TENNESSEE.

The following curiosity, known as the Wickham Bill, has been introduced into the legislature of the State of Tennessee:

"SECTION 1. Be it enacted by the General Assembly of the State of Tennessee, that it shall be a misdemeanor for any person or persons to sell or give away within the State of Tennessee, any morphine or any preparation or mixtures containing the active property or principle of morphine, except on the written prescription of a practising physician, and said prescription is not to be refilled, except at the instance of the physician giving the prescription, who shall give written permission to the party to whom prescription was given, to have same refilled; provided, that nothing in this act shall apply to the wholesale dealer in supplying the retail dealer, or to the retail dealer who may sell to practising physician.

SEC. 2. Be it further enacted, that any person or persons violating the provisions of this act shall be deemed guilty of a misdemeanor, and on conviction shall be fined not less than $10, nor more than $500, and imprisoned in the county jail where the person

or persons reside at the time of commission of said offense, not less than thirty days nor more than ninety days imprisonment, only in the discretion of the court.

The expression, "active property or principle of morphine," and in the 2d Section," imprisoned in the county jail where the person or persons reside at the time of commission of said offence," are excellent examples of the use of language to conceal thought, and are samples of the careless phraseology in many of the existing pharmacy laws.

Decisions of Interest to Pharmacists.

Lawfulness of combinations to maintain prices sustained.

The suit of the Los Angeles, California, cutters against the Retailers' Association and the jobbers of that city, for $50,000 damages received because of an alleged unlawful combination to prevent the plaintiffs from procuring goods, has been decided in favor of the defendants. The court in its opinion follows the line of recent decisions and maintains the principle that the producers or sellers of an article have the right to fix the price at which the same may be sold, and to refuse to supply the same to others who will not agree to maintain such prices.

Responsibility of druggists for poisonous prescriptions.

A recent police court decision at Cleveland, Ohio, is of interest to pharmacists.

The case was as follows: A physician gave a druggist's clerk a verbal prescription to put up a certain quantity of tincture of aconite, to be labeled "ten drops in a glass of water and then a teaspoonful every hour," which was done. The mother of the child gave it first the ten drops in a glass of water, and an hour later a teaspoonful of the pure tincture, resulting of course in the death of the patient. The clerk who put up the prescription was arrested under the law given below.

The Ohio label law, divested of superfluous verbiage, declares that when any dealer shall sell any drug or medicine an indiscriminate or careless use of which would be destructive to human life, he shall affix to each bottle or package a label in red ink, bearing the name of the drug, skull and cross bones, the words caution and poison, and the names of at least two of the most readily obtainable

effective antidotes. It contains no clause exempting physicians' prescriptions from the law.

Judge Fiedler, before whom the hearing was had, decided in favor of the defendant, the following being the salient points of his decision :

"The relation between the druggist and his customer is two-fold :

"(1) When he sells an article purely and simply, where his professional skill is not brought into account, as, for example, where a customer purchases 15 cents worth of tincture of aconite. In this case we have a purely commercial transaction, that is, a sale, and Section 4354–64 applies.

"(2) Where a customer brings a prescription, or, as in our case, the prescription is left by the physician, and the customer calls for the medicines, a different relation exists between the parties in this latter case. There are the three parties necessary, the physician, druggist and purchaser. The physician examines his patient and decides what shall be used—the patient has no choice in the matter whatever—he takes what is given him. He relies upon the skill of the physician, and, having received his prescription, he relies upon the druggist to follow the directions therein set forth. He must have confidence in the ability of each of them, that of the physician to diagnose the case and that of the druggist to execute the directions of the physician in compounding and dispensing the drugs, chemicals and poisons into a medicine. When once compounded or dispensed, these drugs, chemicals and poisons lose their identity. They are not so much aconite, morphine, alcohol, water or whatever the ingredients may be; it is a medicine and nothing but a medicine.

"The physician must be the best judge of the proper remedy and must know how that remedy should be applied. He directs the druggist what to use and in what proportions, and he tells him just how that compound should be used. It is an extremely delicate and dangerous operation, and any variation, even in the slightest degree, from the directions so given, may, and in most cases of dangerous illness undoubtedly would, prove fatal. In the case before us it did prove fatal. For the performance of this service the druggist charges as any other professional. This is no more a sale of that medicine, as the law contemplates a sale, than it is a sale when a lawyer charges his client for writing a letter or a contract. His

charge is not for the paper or material used, but for his professional services.

"Technical words, when used in referring to a technical subject, are to be given the meaning which they have when applied to the particular art or science with reference to which they are used, *i. e.*, their technical meaning. So an act relating to commerce is interpreted according to the vocabulary of merchants, and it naturally follows that an act relating to druggists and physicians must be interpreted according to their vocabulary. (23 Ency. of Law, 324.)

"In the vocabulary of druggists this was clearly not a sale, but was a dispensing, and when a medicine is composed of several ingredients it is a compounding.

"In the opinion of the court this was not a sale of any drug or chemical or poison within the meaning of Section 4354–64, and the defendant is accordingly discharged."

As some higher courts have construed the subject differently in similar cases, it will be the part of wisdom of Ohio pharmacists to see that at the next session of the Legislature the poison statute is amended so as to remove all chance for ambiguity.

PRACTICE OF MEDICINE DEFINED.

The Council of the Ontario Medical Society employed an informer to detect cases of counter prescribing, and on the evidence thus procured brought cases against several druggists, one of them being King *vs.* Lee and others. The magistrate deciding against the defendants, an appeal was taken before Judge McDougall, who reversed the magistrate's decision with costs upon the prosecution. The main points of Judge McDougall's opinion are as follows:

"The conviction only sets out one *act as occurring on a named day.* I have already discussed very fully in Reg. *vs.* Whalen (not reported) what must be shown to amount to a practising of medicine. The single *act of prescribing medicine to one person on one day will not amount to a practising of medicine.* The conviction charges that the defendant, on the date named in the conviction, prescribed for Minnie Warring and others contrary, etc. Upon looking *at the testimony there is no evidence of the defendant on that day or at any prior date having prescribed for any one.* Evidence *of acts of practising* antecedent to the date named in the conviction might, no doubt, be given to *establish a practising*, and possibly evidence of acts of prac-

tising subsequent to the date laid in the conviction but before the date of the information, might be given as establishing or tending to establish a practising of medicine. These acts, however, must be sufficiently proximate in point of time to afford evidence of practising rather than tending to establish the commission of a separate offence. (Apothecaries *vs.* Jones, I. Q. B. D., 893).

Under the case of Reg. *vs.* Spain, 19 Ont., 315, and the cases therein cited, it has been held that it is necessary that the conviction should set out the particular act or acts by the defendant which constitute the practising. The present convictions do not do so, and in this particular they are therefore defective."—*Canadian Pharmaceutical Journal.*

PHARMACEUTICAL MEETING.

The seventh of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1900–1901 was held Tuesday, April 16, 1901. Mr. James T. Shinn, a well-known member of the College, presided. The meeting was different in one or two particulars from the majority of meetings, and as interesting as any that have been held this year.

The first speaker was Dr. L. Napoleon Boston, a well-known bacteriologist and physician in Philadelphia, who read an interesting paper on "Technique for the Recognition of Certain Animal Parasites in Man" (see page 228). In connection with this paper the speaker exhibited a number of microscopic slides of these parasites in different stages of development. Professor Lowe said that the paper of Dr. Boston was of practical importance, and in commenting upon the subject of tape worms said, that he had given some attention to their removal and that he believed that the tænifuge was not so important as the manner of treatment.

In view of the interest that has been aroused in the subject of expert testimony by Professor Lloyd's treatment of the strychnine test with sulphuric acid and bichromate of potassium, Mr. Kebler read a paper on "An Examination of the Chemical Tests for Strychnine." The speaker gave a brief review of the general methods for recovering the alkaloids from organic mixtures. In reference to color reactions, he said that these were influenced by the

concentration and purity of the substance, and that they served simply as useful guides to be considered in connection with other properties. Where the substance occurs in sufficient quantity to be crystallized, the speaker considered the microscopical examination one of the most reliable of tests for establishing its identity.

Mr. Freeman P. Stroup, Instructor in Chemistry in the College, made, at the request of Professor Kraemer, an examination of some powders which were submitted him by Professor Lloyd, the composition of which was as follows, although this composition was not known at the time the tests were made, with the exception of No. 1: (1) Mixture of hydrastine, 1 part, and morphine, 9 parts. (2) Mixture of No. 1, plus 10 per cent. of strychnine. (3) Mixture of hydrastine, 1 part, and morphine, 9 parts. (4) Mixture of No. 1, plus 25 per cent. of strychnine. (5) Mixture of No. 1, plus 50 per cent. of strychnine. (6) Mixture of No. 1, plus 10 per cent. of strychnine. (7) Mixture of No. 1, plus 25 per cent. of strychnine.

The tests were carried out on crucible lids, and, as nearly as possible, under the same conditions, and a sample of pure strychnine was tested under the same conditions in order to note similarities or differences in behavior.

In each case eight drops C. P. sulphuric acid (sp. gr. 1·84), weighing approximately ·230 grammes, was placed upon crucible lid, and to it was added a small portion (·010 to ·012 grammes) of the powder to be tested, and stirred around with a glass rod until dissolved. A fragment of potassium bichromate size of pin head (about ·006 gramme) was then dropped in and moved about with glass rod. In the case of the strychnine a violet-blue streak followed the bichromate, whether the crystal was moved rapidly or slowly, but the color was transient, changing in one or two seconds to yellow or orange.

In the case of all the others, if the crystal was moved rapidly the streak was greenish-yellow, changing rapidly to purplish-violet, while a slow tracing with the crystal produced the purplish-violet streak at once. The shades produced were not strictly identical, but so nearly alike that a description could not be given that would give a definite idea of their differences. No. 3 and No. 4 had a sort of blue-grayish cast, and No. 1 gave the deepest shade, being practically a purple. In the case of No. 5 the purplish color disappeared after about an hour, and thereafter the moving of the

crystal showed the same color effects as was shown in the test for pure strychnine.

After four hours three or four drops of sulphuric acid and a somewhat larger crystal of bichromate were added to each test, producing after a time a gradual change of the purplish colors of Nos. 2, 3, 4, 6 and 7 to violet brown in the case of Nos. 2, 3 and 4, and light green in the case of Nos. 6 and 7; but in none of these five cases could any indication of the presence of strychnine, either by streak or after-color, be detected. Mr. Stroup also tested these powders before the audience at the close of the meeting.

Prof. F. X. Moerk spoke of the influence of one alkaloidal body upon another and as interfering in giving definite characteristic reaction. He spoke of the use of solvents as in Dragendorff's scheme for separating the alkaloids and showed how it could be applied in the examination of the above powders. He also referred to the old acid color tests for the identification of fixed oils and said that owing to the recent improvements of the oils the bodies which had given these reactions were removed and therefore color tests were now considered to be of less value. The last of these to be abandoned was the test for oil of sesame with hydrochloric acid and sugar. On the whole it was the opinion of Professor Moerk that these tests are valuable so far as they go, but that all other tests must be used.

Mr. Beringer spoke of the difficulties in the examination of post-mortem material, and referred to the influence of ptomaines in modifying color reactions as many of these closely simulate the alkaloids and other substances. In nearly all cases of this kind Mayer's reagent will give a reaction, but the substance cannot be isolated on account of the smallness of the quantity present. He mentioned the following alkaloids as being closely simulated by ptomaines: Colchicine, atropine, strychnine, etc. He spoke of a musty sample of corn-meal which yielded a ptomaine giving the reaction and physiological symptoms of strychnine. This body was subsequently broken up into a body resembling nicotine and another one like strychnine.

F. T. Gordon referred to a post-mortem case in which what was supposed to be six or seven grains of strychnine were isolated, but which was found upon investigation to be a ptomaine. He thought that an important point had been overlooked in this controversy, and that was if we did not know the composition of the

mixture (Lloyd's) would we not be inclined to look upon it as being strychnine.

In commenting upon the use of the microscope in the examination of substances in small quantities, Professor Kraemer said that as a result of experiments which he had carried out there were certain difficulties in the work which prevented the uniform crystallizing of the same substance. He had found that on crystallizing solutions of alum in watch crystals the crystals separate in three or four different forms apparently of the same system, although he thought that even the system of crystallization might be different but had not investigated this point as yet. It is well known that calcium oxalate occurs in the monoclinic and tetragonal system. In other words, microscopic physical conditions must be taken into account in work of this kind.

William S. Weakley, Instructor in Botany and Pharmacognosy in the College, gave a paper and demonstration on "Photographic Development by Gas Light." (See page 234).

Frederick T. Gordon read a paper on "Liquid Carbonic Acid Gas." (See page 237).

Mr. Stedem exhibited a device made by Dr. William P. Grady for making the cold contact nitric acid test for albumin. H. K.

THE PHILADELPHIA COLLEGE OF PHARMACY.

EIGHTIETH ANNUAL COMMENCEMENT.

The exercises connected with conferring the degrees of Doctor of Pharmacy and Pharmaceutical Chemist were held in the Academy of Music, Wednesday evening, April 17th. Prayer was offered by Rev. Kerr Boyce Tupper. The degrees were conferred by the President, Howard B. French. The following received the degree of Doctor of Pharmacy :

Name.	*Subject of Thesis.*	*State.*
Alden, Harley Roscoe,	*Assay of Spiritus Ætheris Nitrosi*,	Maine.
Anstock, Arthur David,	*Substitution in Pharmacopœial Formulæ*,	Pennsylvania.
Barnett, Eldridge Ewing,	*Liquor Potassii Arsenitis, U.S.P.*,	New Jersey.
Bell, Robert Nevens,	*Keratinized and other Enteric Pills*,	Nebraska.
Benner, Frederick James,	*Russian and American Pharmacy*,	Pennsylvania.
Boesch, Theodore Karl,	*Ancient History of Pharmacy*,	Pennsylvania.
Boltz, Paul Kline,	*Pharmacology of Jaborandi*,	Pennsylvania.
Borrowes, George Henry,	*Pharmacy*,	Pennsylvania.
Boyson, Theophilus H., Jr.,	*Digitalis*,	New Jersey.

Name.	*Subject of Thesis.*	*State.*
Branin, Manlif Lewis,	*Cochineal*,	New Jersey.
Brenner, Frederick Arthur,	*Synthetic Remedies*,	Pennsylvania.
Cather, Frank Leslie,	*Disguising the Taste of Castor Oil*,	Pennsylvania.
Collins, Lane Verlenden,	*Nickel*,	New Jersey.
Cone, Earl Hobart,	*Bottled Ammonia*,	New York.
Converse, Howard Romaino,	*Strophanthus*,	Pennsylvania.
Davis, William Brown,	*Pimpinella Anisum*,	Pennsylvania.
Doan, Chester Clayton,	*Oleum Ricini*,	Pennsylvania.
Dunn, Edwin Alfred,	*Magnesium Carbonate*,	Pennsylvania.
Eckels, Paul,	*Nicotiana Tabacum*,	Illinois.
Eddy, Roswell Martin,	*Spiritus Ætheris Nitrosi*,	Pennsylvania.
Eppler, George Theodore,	*Sodii Chloridum*,	Pennsylvania.
Fegley, Florence Augusta,	*Official Medicinal Plants of Lehigh County*,	Pennsylvania.
Fegley, John Stauffer,	*Oleum Morrhuæ*,	Pennsylvania.
Fischer, Adolph Gustave,	*Tincture of Ferric Chloride*,	Pennsylvania.
Fisher, George Calvin,	*Substantial Powder Folder*,	Pennsylvania.
Fleming, Samuel Clarkson,	*Eriodictyon*,	Pennsylvania.
French, Rolland Hall,	*Seidlitz Powders*,	Ohio.
Garber, Elmer F. Weaver,	*Cultivation of Tobacco*,	Pennsylvania.
Goodyear, Harry Jacob,	*An Antidote to Gelsemium Sempervirens*,	Pennsylvania.
Gruel, John Edward,	*Gelatin Capsules*,	Pennsylvania.
Harris, William K. Garfield,	*Thymol Iodide*,	Pennsylvania.
Harbord, Kittie Walker,	*Berberis Aquifolium*,	Oregon.
Hassinger, Samuel Reed,	*Analysis of one thousand Prescriptions*,	Pennsylvania.
Haydock, Mabelle,	*The Bacteriological Examination of some Clinical Thermometers*,	Pennsylvania.
Highfield, Herbert Monroe,	*Potassa et Calx Sulphurata*,	Ohio.
Hill, George Price,	*Atropa Belladonna*,	Pennsylvania.
Hires, Lewis Moore,	*Vaccine Virus*,	New Jersey.
Hoffert, Charles Edward,	*Milk Sugar and its uses in Pharmacy*,	Pennsylvania.
Hoffman, Ira Calvin,	*Maple Sugar*,	Pennsylvania.
Houston, Franklin Paxson,	*Antitoxin*,	Pennsylvania.
Hubler, Guy Garfield,	*Phosphorus*,	Pennsylvania.
Jetton, James Stuart,	*Ginseng*,	Tennessee.
Klopp, Edward Jonathan,	*Refined Cocoanut Oil*,	Pennsylvania.
Knerr, Charles George,	*Potassii Nitras*	Pennsylvania.
Kraus, Otto Louis,	*Coal Tar*,	Connecticut.
Lacy, Burdett Seldon,	*Manaca*,	Pennsylvania.
Leib, Wilbur John,	*Glonoinum*,	Pennsylvania.
Lewis, Fielding Otis,	*Tecoma Radicans*,	Kentucky.
Liebert, Louis Williams,	*Rhamnus Purshiana*,	Pennsylvania.
Luddy, James Darrah,	*Rhus Toxicodendron*,	Pennsylvania.
Luebert, Frederick George,	*The Examination of Commercial Hypochlorites*,	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
McClurg, Benjamin Hoffer,	*Emulsions*,	Pennsylvania.
McDermott, Robert Joseph,	*Borax*,	Pennsylvania.
MacFadden, Warren Lester,	*A Resin-free Syrup of Senna*,	Pennsylvania.
Macphee, John James,	*Gossypium Herbaceum*,	Nova Scotia.
Mauger, Harry Fillman,	*Liquor Magnesii Citratis*,	Pennsylvania.
Michels, Victor Clyde,	*Loss of Moisture in Inorganic Salts*,	Illinois.
Murphey, Edwin Mason,	*The U. S. P. Products of the Pine*,	Mississippi.
Musser, Guy Musselman,	*The Modification of Milk as of interest to Pharmacists*,	Pennsylvania.
Nauss, George Hill,	*Acacia*,	Pennsylvania.
Picking, Jacob Sylvester, Jr.	*Elixir Ferri Pyrophosphatis Quininæ et Strychninæ*,	Pennsylvania.
Pflieger, Adam William,	*Filocarpus Pennatifolius*,	Pennsylvania.
Post, Arthur Edward,	*Tinctura Opii Deodorati (with Paraffin)*	Pennsylvania.
Pursel, Robert Clayton,	*Sanguinaria*,	Pennsylvania.
Raser, William Heyl,	*Tr. Opii Deodorati (by Benzin)*	Pennsylvania.
Reynolds, Clarence Hyatt,	*N. A. Hemlock and Tanning Process*,	Pennsylvania.
Rhoads, Luther K.,	*Asafœtida*,	Pennsylvania.
Rinker, William,	*Rhamnus Purshiana*,	Pennsylvania.
Roberts, George William,	*Copaifera Officinalis*,	Pennsylvania.
Rogers, Walter Clyde,	*Relation of Physician and Druggist*,	Pennsylvania.
St. Jacques, Gaston,	*Tinctures of B. P. and U. S. P.*,	Canada.
Saul, Irvin Ellsworth,	*Unguentum Aquæ Rosæ*,	Pennsylvania.
Schmerker, Adolph A. Beyer,	*Tincture of Myrrh*	Pennsylvania.
Schneider, Emil Sebastian,	*Tannin and its Extraction*,	Pennsylvania.
Schooley, Joseph Griggs,	*Gossypium Herbaceum*,	Pennsylvania.
Shafer, Clarence Eugene,	*Malt and its Preparation*,	Pennsylvania.
Shannon, Byron Guest,	*Perfumes in the Drug Store*,	Pennsylvania.
Shoults, Robt. Grafton, P.C.,	*Examination of Acacia*,	California.
Skillman, Lionel Gilliland,	*Unguentum Hydrargyri Nitratis*,	Pennsylvania.
Slocum, Charles Eben,	*Aurum*,	Illinois.
Spears, Edward Gibson,	*Aqua Hydrogenii Dioxidi*,	Pennsylvania.
Steever, William Forsaith,	*Glyceritum Rhois Glabræ*,	Pennsylvania.
Stoudt, Irwin Sylvester,	*Capsules*,	Pennsylvania.
Stout, Benjamin Franklin,	*The Twentieth Century Pharmacist*,	Pennsylvania.
Strathie, Alexander John,	*Acidum Salicylicum*,	England.
Texter, Charles Henry,	*Horse Chestnut*,	Pennsylvania.
Tingle, John Beard,	*Flour of Sulphur*,	Ohio.
Urffer, Samuel,	*Iron*,	Pennsylvania.
VanGilder, Levi Morton,	*Diphtheria Antitoxin*,	New Jersey.
Watson, Herbert James,	*Color Standards of the Vegetable Drugs of the U. S. P.*,	Delaware.
Wilkinson, Harry,	*Surgical Antiseptics*,	Pennsylvania.
Wolfer, William Conrad,	*Antipyrin*,	Pennsylvania.
Wolfinger, John Philip,	*Erythroxylon Coca*,	Pennsylvania.
Ziegler, Charles Harry,	*Syrupus Ferri Iodidi*,	Pennsylvania.

The following received the degree of Pharmaceutical Chemist:

Name.	*Subject of Thesis.*	*State.*
Bender, Arthur Clarence,	*The Saponin of the Root of Phytolacca Decandra L.,*	Iowa.
Brookes, Virginia Cade,	*The Mesquite,*	Texas.
Graham, Willard Rice,	*Pumpkin Seed Oil,*	Pennsylvania.
Headings, Prestie Milroy,	*Glycerin,*	Pennsylvania.
Penrose, Thomas William,	*Distilled Water,*	Pennsylvania.
Pollins, Harry G. Lomison,	*The Preparation of Ointments,*	Pennsylvania.
Ryan, Thomas Andrew,	*Adeps Benzoinatus,*	Pennsylvania.
Scott, Henry William,	*Assay of Zinc Ore,*	Pennsylvania.

The Certificate of Proficiency in Chemistry was awarded to the following:

Andrews, Willard Crandall, P.D.; Cavanaugh, Frank Arthur; Ehman, Joseph William, Ph.G.; French, Rolland Hall; Smith, Frank G. D., Ph.G.; Staley, Frederick Walton; Winters, Olas Earl.

Prof. Joseph P. Remington, Dean of the Faculty made the announcement that among the prizes offered this year was one to the class as a whole. This was the President's cup offered by the President of the College, Howard B. French, in commemoration of the eightieth anniversary, and is intended also as an incentive to study to each of the individual members of the class. It is to be held in trust by this class until a succeeding class attains a higher grade of scholarship.

The Valedictory was delivered by Hon. Charles F. Warwick, who gave a short résumé of the history of the College and referred to some of the conditions existing in pharmacy and medicine in the early part of this century and compared them with those of to-day. This was followed with some very wholesome and pertinent advice to the members of the graduating class.

THE PROCTER PRIZE of a gold medal and certificate for highest grade of scholarship and meritorious thesis was awarded to Irvin E. Saul and presented by the President, Howard B. French.

THE WILLIAM B. WEBB Memorial Prize of a gold medal and certificate, offered by Mrs. Rebecca T. Webb for the highest general average in the examination of the committee, operative pharmacy and specimens, was awarded to Edwin M. Murphey and presented by William J. Jenks.

CHEMISTRY PRIZE, a prize of $25 in gold offered by Prof. Samuel P. Sadtler, for knowledge of quantitative chemical analysis, was awarded to Earl H. Cone.

MATERIA MEDICA PRIZE, a prize of $25 by Prof. Clement B. Lowe, for the recognition of rare drugs, was awarded to Lionel G. Skillman.

PHARMACOGNOSY PRIZE, a prize of $25 by Prof. Henry Kraemer for the best thesis on the Pharmacognosy of vegetable drugs, was awarded to Herbert J. Watson.

THE MAISCH PRIZE, a prize of $20, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was awarded to Lionel G. Skillman and presented by Joseph L. Lemberger.

OPERATIVE PHARMACY PRIZE, a prize of $20 in gold, offered by Prof. Joseph P. Remington for the best examination in operative pharmacy, was awarded to Edward J. Klopp, the presentation being made by James T. Shinn.

THEORETICAL PHARMACY PRIZE, a prize of a fine Troemner agate prescription balance, offered by Mahlon N. Kline, for the best examination in theory and practice of pharmacy, was awarded to Irvin E. Saul.

COMPLIMENTARY SUPPER OF THE FACULTY.

The professors' farewell supper to the graduates was given on Tuesday evening, April 16th, in the Museum of the College. Many of the officers and trustees of the College were present, as also other invited guests. The supper having been served, the remainder of the evening was devoted to toast-making and other matters of interest. The President's cup, which has already been alluded to, was presented on this occasion. It is of silver, and is in the form of a loving cup, being 12 inches in height and 7¾ inches in diameter, and is inscribed in an appropriate manner. The cup was received on behalf of the class by Victor C. Michels.

A very gratifying feature of the occasion was the presentation to the College of a portrait painting of the late Charles August Heinitsh, on behalf of his friends of the Pennsylvania Pharmaceutical Association, by Joseph L. Lemberger, who gave a brief but impressive sketch of the life and character of Mr. Heinitsh.

This was succeeded by another interesting presentation, viz., a portrait of the late Dr. Edward R. Squibb, which was presented on behalf of his family by Prof. Joseph P. Remington. Professor Remington having enjoyed a long personal acquaintance with Dr. Squibb, spoke in a manner befitting his work and attainments, and his influence on pharmacy and medicine. The President accepted both of these presents on behalf of the College, and said that there was no more fitting place for them than the Philadelphia College of Pharmacy.

Professor Remington, as Dean of the Faculty, acted as toast-master, and toasts were responded to by the members of the Faculty and Instructors, some of the members of the College and Board of Trustees, and by many of the members of the graduating class.

BACCALAUREATE SERMON.

In connection with the other exercises of Commencement Week, a baccalaureate sermon was delivered to the graduates on Sunday, April 14th, by Dr. C. E. Stevens, Rector of Christ Church, Second and Market Streets. Incidentally it may be mentioned that this church is one of the most interesting structures in Philadelphia, retaining the architectural appearance of the early colonial time, and having been the place of worship of Franklin and the early Presidents of the United States.

THE ALUMNI ASSOCIATION.

The thirty-seventh annual meeting of the Alumni Association was held in Alumni Hall, on Monday afternoon, April 15th, with the President, Theodore Campbell, in the chair.

Following the annual address of the President, in which a number of recommendations were made relative to the interests of the Association, reports from the Treasurer, Secretary and Editor of the ALUMNI REPORT were read. Reports were also received from the several standing committees of the Association.

The following is the list of officers elected for the ensuing year: President, John H. Hahn; First Vice-President, Wm. G. Nebig; Second Vice-President, Albert Oetinger; Recording Secretary, Wm. E. Krewson; Treasurer, C. C. Meyer; Corresponding Secretary, J. M. Baer; Board of Directors: O. W. Osterlund, F. P. Stroup, Nicholas F. Weisner, Herman Dilks, Jr., and L. S. King.

The thirty-seventh annual reception of the Association was given to the graduating class, on the evening of the same day, in the College Museum.

Introductory remarks having been made by the President, the Secretary called the roll of members elected during 1900-01. An address to the new members was then delivered by Jos. L. Lemberger, of Lebanon, Pa.

The several prizes offered by the Association were presented as follows:

The Alumni gold medal to the member of the graduating class receiving the highest general average, was awarded to Irvin Ellsworth Saul, the presentation being made by the President, Theodore Campbell.

The Alumni prize certificates to the members of the class receiving the highest averages in each of the branches, were awarded as follows, Mr. Mahlon N. Kline making the presentation: In Pharmacy, to Irvin Ellsworth Saul; in Chemistry, to Edwin Mason Murphey; in Materia Medica, to Lionel Gilliland Skillman; in General Pharmacy, to Rolland Hall French; in Operative Pharmacy, to Edward Jonathan Klopp; in Analytical Chemistry, to Frederick George Luebert; in Pharmacognosy, to Howard Romaine Converse.

The Alumni silver medal was awarded to David Wilfong Ramsaur, of Palatka, Fla., for the best general average in the second year examination.

The Alumni bronze medal was awarded to Chester Augustus Billetdoux, of North Adams, Mass., for the best general average in the first year examination.

The class oration was given by Theodore K. Boesch; the poem by Fielding O. Lewis; the history, by James S. Jetton, and the prophecy, by Alexander J. Strathie.

ANNUAL MEETING OF THE COLLEGE.

The annual meeting of the members of the Philadelphia College of Pharmacy was held on March 25, 1901, at the College, 145 North Tenth Street. Forty-one members were present, the President, Howard B. French, presiding. The minutes of the quarterly meeting held December 31, 1900, were read and approved. The minutes of the Board of Trustees for the meetings in January, February and March were read by the Registrar, W. Nelson Stem, and approved as read.

The annual meeting being the occasion for reports of the officers and Standing Committees, these were given in the following order:

Committee on Publication by H. N. Rittenhouse, who among other things called attention to the fact that all bills for the past year have been paid, and there is a cash balance to the credit of the committee. There has been an observance of economy in several respects.

During the year a number of problems have been considered by the committee, and while no radical measures have been attempted everything in the direction of a wise economy has been realized. The number of unsold volumes on hand is about 1,600, covering the period from 1829 to date.

Editor's Report, by Henry Kraemer. Alluding to the beginning of the new century, the editor gave a retrospective view of the JOURNAL and followed with a consideration of the problems of the present and giving some suggestions in regard to the future.

Librarian's Report, by Thomas S. Wiegand. This report states that 210 volumes have been added during the year, besides a large number of pamphlets.

The library has been consulted much more during the past year than for several years past.

Committee on Pharmaceutical Meetings, by Henry Kraemer. These meetings have been held regularly during the College year. The programs have been full of interesting and valuable matter, and in this respect have been as successful as could be desired.

Curator's Report, by Joseph W. England. He reports the museum in good condition, and has received a number of accessions during the year. The working collection of official drugs and preparations placed in the reading room has been in daily use by a large number of students, and has proven of great value to them.

A new feature of the annual meeting was the report of the President, giving concise information as to the affairs of the College. There has been a slight decrease in the College debt from the previous year.

There has been established during the year the Keasby and Mattison scholarship, making a total of six scholarships now available.

The property has been well cared for and kept fully up to its past standard.

The adoption of an amendment to the By-Laws creating a Committee on Nominations, it is believed will prove of material advantage to the College.

The President alluded to the kind consideration shown him during the year, and concluded by stating that the continued success and prosperity of the College depends upon the active co-operation of all the members.

Delegates were appointed as follows :

American Pharmaceutical Association, at St. Louis, September 16, 1901—Prof. Henry Kraemer, William L. Cliffe, William McIntyre, J. H. Redsecker and Prof. C. B. Lowe.

To the Pennsyvania Pharmaceutical Association at Harvey's Lake, June 18–20, 1901—Mahlon N. Kline, Harry L. Stiles, E M. Boring, Joseph W. England and C. A. Weidemann.

Fred T. Gordon offered the following resolution, which was adopted :

"*Resolved*, That the professors of the College recommend to the students the queries of the Pennsylvania Pharmaceutical Association as suitable subjects for theses, and that this be referred to the Committee on Theses for action."

The election of officers, Trustees and Standing Committees being next in order, William McIntyre and Henry C. Blair, third, were appointed tellers, who reported the following as being elected :

President, Howard B. French ; First Vice-President, William J. Jenks ; Second Vice-President, Dr. R. V. Mattison ; Recording Secretary, Dr. C. A. Weidemann ; Corresponding Secretary, Dr. A. W. Miller ; Treasurer, James T. Shinn ; Librarian, Thomas S. Wiegand ; Curator, Joseph W. England ; Editor, Prof. Henry Kraemer.

Trustees for three years : Prof. Samuel P. Sadtler, William L. Cliffe and Joseph L. Lemberger. Committee on Publication : Henry N. Rittenhouse, Prof. Samuel P. Sadtler, Wallace Procter, Prof. Henry Kraemer, Joseph W. England, Prof. Joseph P. Remington and Dr. R. V. Mattison. Committee on Pharmaceutical Meetings—Dr. R. V. Mattison, Prof. Joseph P. Remington, Prof. C. B. Lowe, F. W. E. Stedem, Prof. Henry Kraemer.

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